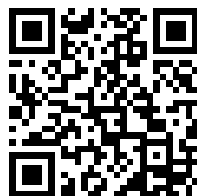

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The Book of Knowledge

The Children's Encyclopædia

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H. G. FLEMING

Volume VII.

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This is a short guide only to the principal contents of this volume. It is not possible to give the titles of all the Poems and Rhymes, Legends, Problems, colour pages, questions in the Wonder Book, and many other things that come into the volume; but in all cases are given the pages where these parts of our book begin. The full list of these things comes into the big index to the whole work.

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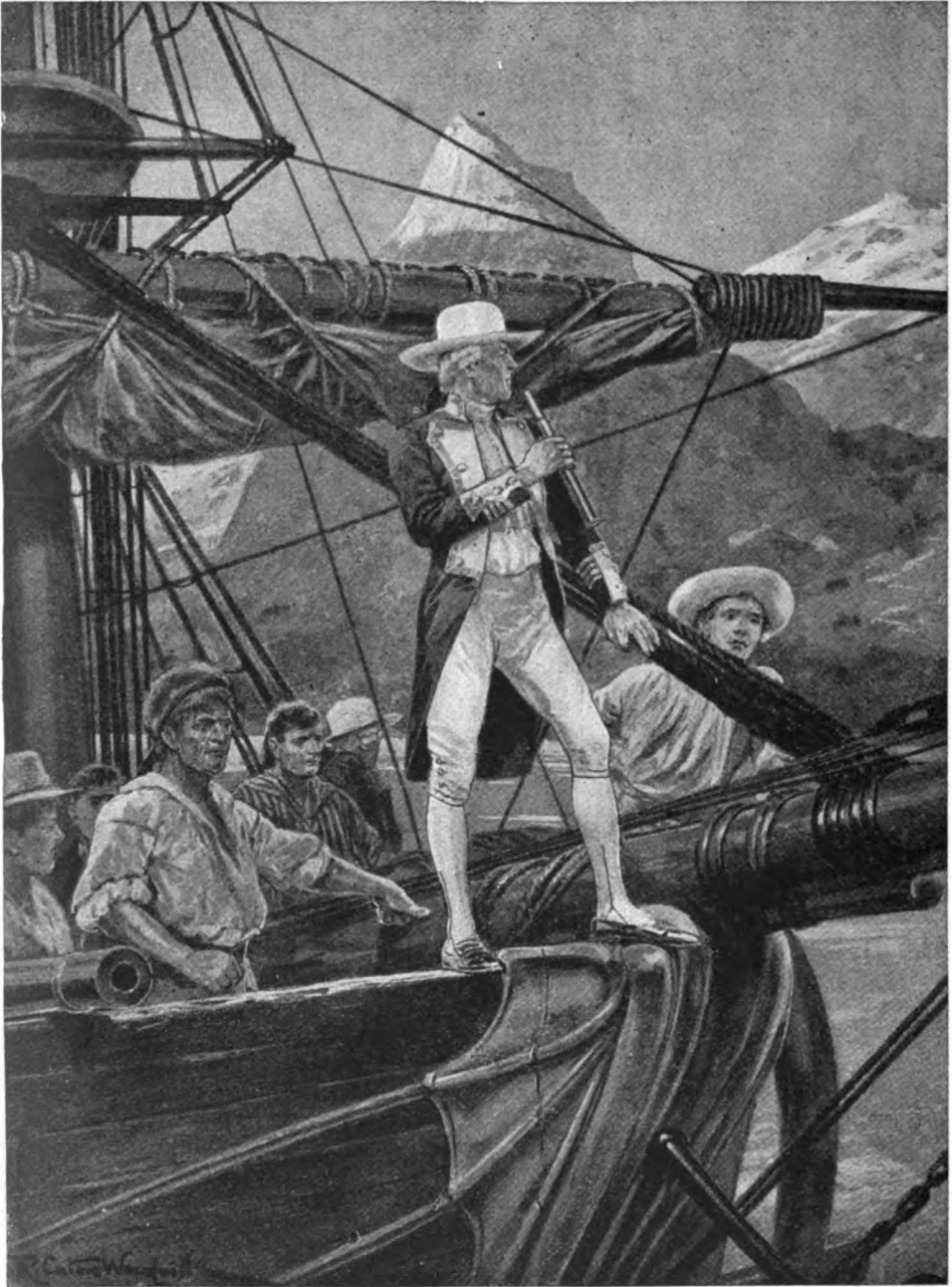
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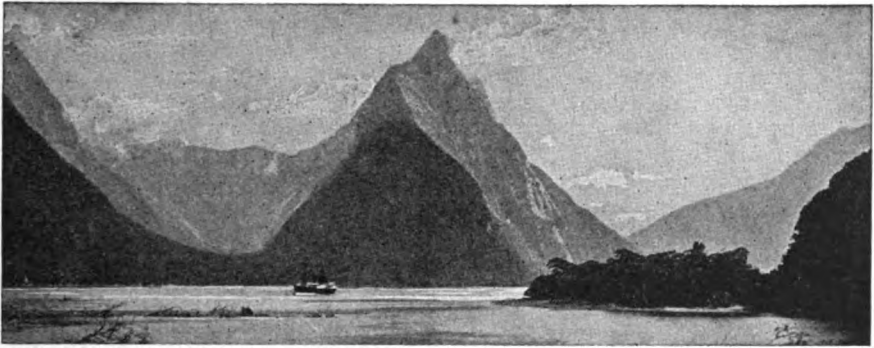
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FINDING THE OTHER SIDE OF THE WORLD



On page 354 we read about the wonderful adventures of Captain James Cook. In this picture we see this famous navigator on his little ship, the "Endeavour," sailing round the mountainous shores of New Zealand. It was during his first voyage, which lasted from the year 1768 to 1771, that Captain Cook found New Zealand. He sailed right round New Zealand, being the first man to do so, and brought home to England a description of the wonderful island, which is very similar to the United Kingdom in size and climate. Not content with his discoveries on his first voyage, Cook made two more voyages to this part of the world, and cruised about discovering many of the islands in Oceania. In his last voyage Captain Cook discovered the Sandwich Islands and other groups, but he was unfortunately killed by the natives when trying to land at Hawaii on February 14, 1779.



NEW ZEALAND, THE BEAUTIFUL DOMINION

WHEN Captain Cook sailed away in his little ship, the "Endeavour," in 1768, by order of George the Third, to make discoveries for England in the Southern Seas, he rounded Cape Horn, and found his way to some islands in the midst of the great Pacific Ocean. They are called the Society Islands now, and belong to France. They are so beautiful that they are often called an earthly paradise. If we could but see with our eyes what those dots in the map of the Pacific stand for!

Islands are always pretty, even in a park lake, or off a broken shore. But in this far-away blue ocean, under the golden sunshine, in the clear, balmy air, it is like fairyland, whichever way we look. If we look down into the crystal water, there are the bright-coloured sea creatures darting about, and splendid shells lying on the dazzling white beaches. Some of the islands are so low that they are scarcely raised above the water; on these grow feathery-topped palm-trees, tall ferns, and brilliant flowers and shrubs, through which one can see peeps of the pale-green water of the lake-harbours hidden inside the ring-shaped island. On the higher, larger islands—none larger than New Jersey—grow sugar-canes, tobacco, fruits, and beautiful trees clothe the hill-sides.

CONTINUED FROM 1364



The brown-skinned children of those islands enjoy bathing in the delicious warm sea. They can swim before they can run, and they dive fearlessly through the rolling waves, playing the prettiest water games as nimbly as if they were seals or dolphins. In Captain Cook's time the tribes of people who lived in the various islands were very fierce and warlike; but since his day many mis-

sionaries have gone out to teach them to be more gentle, and to give up their old wild ways and their cruel religion.

Delightful as these islands were—and there are so many that Captain Cook found "discovering" quite bewildering work—the little ship "Endeavour" had to go on and find her way to the land named, a hundred years before by the Dutch sailor Tasman, New Zealand.

Many centuries before that a brown-skinned, wavy-haired sailor chief had run his long canoe aground and beheld with delight the white cliffs and trees of the North Island. "Ao-tea-roa!" he exclaimed, meaning the "Long Bright World," as he and his bold seamen leaped ashore. They had been driven from their homes in far distant islands of the Pacific by stress of war, and to this day, though far away, the dwellers in the eastern islands of Polynesia, and the Maori people found

by Europeans settled in New Zealand, still have in common the same old legends and customs, and speak much the same language. Captain Cook spent six months on his survey of the "Long Bright World." He discovered that there are two large islands, parted by the straits now called after him, and a smaller one to the south—the North, South, and Stewart Islands.

WHERE WE SHOULD COME OUT IF WE COULD FALL THROUGH THE EARTH

Altogether the islands are nearly the size of the United Kingdom, and if we can imagine a line driven straight through the earth, it would come out the other side near the islands of New Zealand. If you look on the map you can see the more exact spot marked as Antipodes Islands, where the feet of people walking—if there were any people there—would be just opposite those in England, though 7,000 miles apart.

Captain Cook describes in his journal how handsome and fine-looking were the Maoris; how curiously they tattooed their faces in patterns; how they wear feather cloaks and green stone ornaments. He mentions, too, their warlike disposition, though on the whole he seems to have got on very well with them, and they promised when he went away not to disturb the two posts he had set up to carry the Union Jack.

In the British Museum are many cases full of the works of the Maoris, as the descendants of the bold Polynesian explorers call themselves, and very beautiful and clever are the carvings and polished tools.

HOW WE CAN HAVE TWO SUMMERS IN ONE YEAR BY GOING TO NEW ZEALAND

But the "Endeavour" had once more to go on her way. Leaving Cape Farewell, as they named it, on the north point of the South Island, and sailing away over a thousand miles to the north-west, the explorers arrived at length on the east coast of New Holland, now Australia, where they found a very different race of natives, the Blacks, perhaps the lowest in the scale of human beings.

For some years after this exploration of Captain Cook, the Maoris remained undisturbed, but for the visits of whalers and traders, and adventurers. On Christmas Day, 1814,

we find them listening, on a beautiful bay in the North Island, to their first sermon from a Christian missionary—Samuel Marsden. A lovely summer open-air festival is Christmas in New Zealand, with abundance of flowers and sunshine, for the seasons there are exactly opposed to ours in the northern hemisphere, and if we leave Vancouver in the delicious spring days, we arrive twenty-one days later in time for golden autumn in New Zealand. Or if we want two summers in a year, we can leave home after our own, and, going even late in our autumn, can still be in time to enjoy another just beginning this other side of the world.

About thirty years after Marsden came, settlements began in earnest. Soon after Queen Victoria came to the throne, New Zealand was proclaimed part of the British dominions. A great Scotch settlement soon followed, on the east side of the South Island, and round Dunedin—the old name for Edinburgh—most of the names came from Scotland. It is said that the children even now speak with a Scotch accent in this land settled by their grandparents.

THE OLD BATTLEFIELDS HIDDEN UNDER FIELDS OF GOLDEN CORN

An English church settlement was made to the north of Dunedin, in the Canterbury plains, with its capital, Christchurch, and visitors from England say that nowhere in this colony does it seem so homelike and so English as amongst these grassy hills and well-watered valleys.

There were, unhappily, wars lasting many years with the Maoris, chiefly connected with the possession and selling of the land. British gun-boats were seen on the peaceful creek, the sound of the bugle echoed over the valleys, and red coats showed up against the green hills. Battlefields to-day lie hidden under fields of corn, for now all is peacefully arranged, and the brave and skilful Maoris have in fifty years settled down to the civilisation of the strangers. They own land which they farm or let; they have flocks and herds, are educated and hold important positions in the country. They have a most ardent love of their own land, and, indeed, they well may have, for it is one of the most beautiful and fertile in the world.

MOUNTAINS OF SNOW AND RIVERS OF ICE



New Zealand's climate is among the best for invalids, and there are many mountains to climb. Here we see Mount Sefton, in that part of New Zealand called Mackenzie. It crowns with rugged glory a scene of perfect beauty.



If New Zealand has fire and steam in the depths of her soil, she has ice on the summits of her mountains. From the Francis Joseph glacier great volumes of water flow, carrying life and fertility to the plains and valleys below.

This love is shared, too, by the people who have made their homes there, and they are proud to hold together as a nation of New Zealanders.

The climate is partly the reason for this; it is so healthy and enjoyable, with no fogs or depressing damp, but with plenty of wind and sunshine, and so the people are strong and capable of working hard and making the most of Nature's gifts.

AUCKLAND, THE MOST BEAUTIFUL CITY OF THE DOMINION OF NEW ZEALAND

How wonderful these gifts are we can see by passing through the provinces that make up the dominion!

We will start in Auckland, the northern province of the North Island. Its capital, Auckland, the largest and most beautiful city of New Zealand, stands on a narrow isthmus only a few miles across, with a harbour on each side; it is often called the Corinth of the South, after the famous town in Greece. North of this isthmus is a narrow peninsula, the land of the wonderful kauri-tree. One can take train from Auckland to the Wairoa River, and thence by steamer for 120 miles along the greatest inland waterway of New Zealand. The banks of this river are alive with the hum of saw-mills, where great saws slice huge logs into planks with extraordinary rapidity. There is a fall on this river like a small Niagara, and the great tree-trunks come crashing down over the edge. The kauri-trees give a sort of gum, like amber, very valuable for making varnish, and further north still are men prodding the ground with long rods to find the gum that dropped from trees that disappeared long ages ago.

WHERE BOILING FOUNTAINS PLAY AND MEN BOAT ON BOILING LAKES

Many Maoris live in this part of the island, celebrated for its warm, mild climate, fit for growing grapes and oranges and lemons, besides the tropical products grown in the distant islands from which the Maoris came centuries ago. The southern part of Auckland is taken up with the Hot Spring Land. In our land we like spring water because it is so deliciously cold. Here in New Zealand in this wonderful tableland, rising into volcanic mountains, with many lakes between, there are thousands and thousands of

boiling springs, all bubbling up from the heated ground and rocks below. Sometimes they burst out with such force that they rise up like a great fountain, over 100 feet high; in other places there are clouds of steam from smaller jets, among which Maori villages are built. The native women need light no fires; the food cooks in the steaming holes; the children bathe in the pools that are only pleasantly warm. Tourists and invalids go to these springs, and many ailments are cured there, and greatly do travellers enjoy the wonderful scenery, and the dancing and singing of the Maori girls.

It sounds adventurous to boat on a boiling lake, but this is what many hundreds of travellers do every summer on what is called the most wonderful lake in the world—Rotomahana, which is Maori for "Warm Lake." Near this lake the country was overwhelmed about twenty years ago by immense showers of mud and ash; much of the rocks and earth is coloured by the substances thrown up by the springs, and the rich green of the ferns and mosses and leafy shrubs—like those in the hottest hothouses at home—make a fairyland of beauty, seen through the gauzy steam veil.

THE RICH GLORIES OF RIVER AND FOREST AND NEW ZEALAND'S BUSY CAPITAL

South of the province of Auckland lie the provinces of Taranaki, Hawkes Bay, and Wellington. Taranaki is the native name for the beautiful mountain Egmont, seen by Captain Cook as he passed, and it gives its name to the province. A hundred miles out at sea the sailor can see the beautifully-shaped cone of snow, lifted high above the green trees and small hills at its base! It rises "lofty and lone" from the fertile plain, and is a favourite resort.

What lovely days can be spent on the rivers of this neighbourhood, one of which is a magnificent water-road into the heart of the North Island! Starting from the upper part in the early morning, we pass through groves of the splendid golden blossoms of the New Zealand laburnum, and other lovely flowers. Over high cliffs of rock, made bright with feathery ferns and many-coloured mosses, dash waterfalls, like threads of spun glass. When the river-bed narrows and forms rapids, the canoes

PEOPLE AT THE OTHER SIDE OF THE WORLD



NATIVE MUSICIANS OF HAWAII, IN THE SANDWICH ISLANDS



A MAN OF SOLOMON ISLANDS



A SOLOMON ISLANDER



A YOUNG LADY OF TONGA



A MAORI CHIEF



A NATIVE OF FIJI



A GROUP OF WELL-TO-DO YOUNG LADIES OF TAHITI

These are types of the people who live in the many islands of Oceania, of which New Zealand is the head and centre. Some of them are British citizens. They were all savages, and many of them were cannibals, until missionaries carried the Gospel to them, and educated them in the ways of gentleness, peace, and civilisation.

The photographs on these pages are by Messrs. Underwood & Underwood (London), Mr. N. P. Edwards (Littlehampton), and others.

shoot over them with great and exciting speed. Where the river runs deeply and slowly, the reflections of the cliffs and the rich glories of the forest are like beautiful pictures, about which we can weave fairy stories to our heart's content.

The city of Wellington is the capital of New Zealand, and has its harbour, the busiest harbour in the dominion, on Cook's Strait. It has fine public buildings, in one of which the New Zealand Parliament sits for six months of the year. Women as well as men, Maoris as well as others, have a vote in choosing their members of Parliament; there are four Maori members. It may well be said of New Zealand that the great body of the people control the affairs of the nation. They already have their old age pensions; their railways, telegraph and telephone lines are owned and worked by the State for the improvement and good of the country, not for private profit. In these and many other ways young New Zealand has laws unlike those of England. Many lines of steamers run from Wellington to various ports; a daily steam ferry runs to Lyttelton, the chief port of the South Island, near Christchurch.

avalanches that fall like thunder and miles of glittering mountains

There are six provinces in South Island—Nelson and Marlborough on the north, Westland and Canterbury in the middle, Otago and Southland on the south. Between Westland and Canterbury runs the beautiful range of the Southern Alps, over 300 miles long, and here one feels in a Switzerland even more beautiful than the one we know and love so well in Europe. The highest mountain, Mount Cook, which the Maoris called "the Light of Heaven," is nearly the height of Mont Blanc. The great ice rivers, or glaciers, are among the most magnificent in the world. From them great avalanches constantly fall with thundering noise, and miles of glittering white peaks against the blue sky contrast in flower-time with the dazzling colours of the beautiful carpet of flowers on the lower mountain slopes.

On the east side of the range lies the great Canterbury plain, one of the richest districts in the country. Here grain stores are found at the stations on the railway line, like the elevators

in Manitoba, for great quantities of wheat and oats are grown.

THE SPLENDID FARMS THAT SEND OUT WOOL, MEAT, & GRAIN ACROSS THE SEAS

Besides this, there are splendid farms for dairy produce, and thousands and thousands of sheep flourish, giving great quantities of valuable wool, and providing, since the introduction of cold storage, the Canterbury mutton and lamb, which helps to feed so many of the people on the other side of the world. Christchurch, the capital of this province, is a beautiful garden city of broad streets and open spaces. In Otago are the famous lakes and fjords, and from this province are also sent away large quantities of wool, meat, and grain. Dunedin—a handsome city, with many churches, is the capital of Otago province. Little more than twenty years ago the first cargo of frozen meat was despatched from this colony, and this trade has grown enormously.

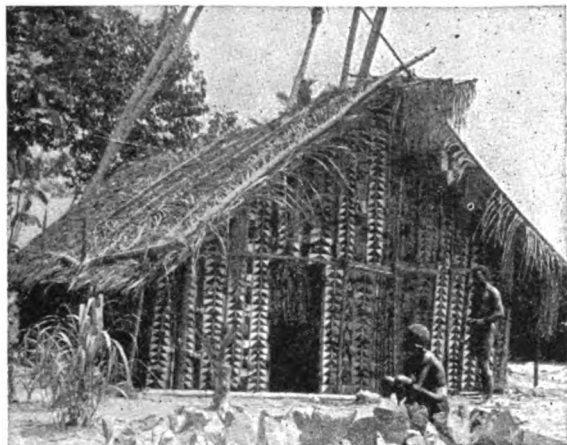
In Southland and Stewart Island, called the "last and loneliest," from its position beyond South Island, is also much grand and beautiful scenery. More ice-capped peaks, large glaciers, and great granite precipices, 5,000 feet high, are found at Milford Sound, and there are falls, one of the wonders of the world, nearly 2,000 feet high, like a silver ribbon hanging over the rough mountain wall. Here and there are dark, woody valleys, and deep sea creeks running far inland, with palm-trees and ferns waving over sandy beaches.

WHERE MEN GO DOWN INTO THE EARTH FOR COAL AND GOLD

A great deal of gold is found in New Zealand, both in the Auckland province and in the river-beds of Otago and Westland. The chief coal-mines are on the west of South Island and in the Auckland province. As the years come there are many more valuable minerals to be worked in New Zealand, chief among them being iron. The green stone found on the west coast of South Island was very much prized by the old Maoris, and the curious weapons and ornaments they made of it are still seen in the museums of the large towns.

As in Canada, there is great value in the water-power stored in the rivers and waterfalls of the country; and it is thought that manufactures will increase rapidly in New Zealand, such

HAPPY HOMES IN THE SOUTHERN SEAS



A HOME IN THE ENGLISH ISLAND OF SANTA CRUZ



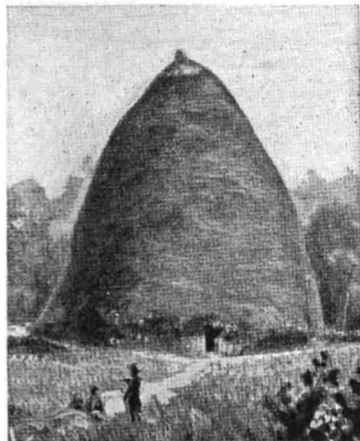
NATIVE HOUSES IN BISMARCK ISLAND



A HOUSE BUILT ON STILTS IN NEW HEBRIDES



A THATCHED HOUSE IN THE FIJI ISLANDS



A HOUSE IN NEW CALEDONIA



A HOUSE BUILT LOW TO AVOID HURRICANES IN SANTA CRUZ

On a journey around the world we see many strange kinds of dwelling-places. These pictures show us how some of the inhabitants of the islands in the great Polynesian group live. This group helps to make up what we call Oceania in the southern seas. Some of these islands belong to France, some to Germany, and others to Great Britain. Their houses do not need to be so solidly built as ours, for the climate is very hot.

as that of making up woollens, owing to the cheap production of electricity, as happened in America last century through the use of coal in making steam.

Now, since the beginning of this century the limits of the dominion of New Zealand have been carried out to include the Cook and other South Pacific islands. In this "Brighter Britain," so near in size to its Motherland, there are scarcely as many inhabitants as in Glasgow or Liverpool; and the population of the four largest towns put together—Auckland, Wellington, Christchurch, and Dunedin—is very little greater than the population of Washington, D.C.

But we have not yet seen all that goes to make up the possessions of Britain in the southern hemisphere, called Australasia, though Australia and New Zealand are far the most important parts of it.

THE GREAT BARRIER REEF THAT RUNS ALONG THE AUSTRALIAN COAST

When Captain Cook sailed away from Botany Bay, and the lovely flowers that so delighted his naturalist friend, the little ship "Endeavour" made her way safely for over a thousand miles northwards along the coast, known for many years afterwards as New South Wales. Suddenly she struck on a hidden, sharp rock, and made a great hole in her side. It was hastily patched up with sail-cloth and tow, and the voyage was continued to a point now called Cookstown, in Queensland.

This was the manner of the discovery of the Great Barrier Reef, which runs along the east coast of Australia, ten to fifteen miles from the shore, acting as a natural breakwater for the harbours of that coast, and making a still and safe passage for shipping when the breakers of a not very peaceful Pacific dash in clouds of white foam upon the line of jagged rocks, now just below, now just above, the level of the sea.

How little could Captain Cook foresee the never-ending lines of ships laden with wool and gold and food that were to steam northward in the years to come, to pass through the Torres Straits on their way to Great Britain!

North of the Torres Straits lies the large island of New Guinea. It is divided among Germany, Holland, and Great Britain. Great Britain's piece

is as large as Great Britain itself. There are many missionaries there teaching and civilising the natives. The climate is very hot, and in it grow best such products as tobacco, rice, sugar, tea, and coffee. There are valuable trees, too, amongst them the cocoanut, the sago palm, sandalwood, and ebony. There are pearl fisheries on the coasts, as on the warm shores of Australia and the Pacific Islands.

THE TWO GREAT CURVES OF ISLANDS RISING FROM THE FLOOR OF THE OCEAN

If we could drain away the water from the ocean as we can from a pond, we should see that the floor of the Pacific, the deepest and largest ocean in the world, rises to the east of Australia in two great curves. New Guinea and Norfolk Island are on the curve nearest the island continent. There is a school in Norfolk Island, to which children from other islands come.

On the outer curve are the Fiji Islands. The native chiefs and people here put themselves under British rule some years ago. Missionaries have taught them, and trade is increasing with Britain, Australia, and New Zealand.

Most tropical plants grow well in Fiji, such as sugar, fruits, and cocoanuts; and still farther beyond lie great groups of islands known as the islands of Polynesia, Melanesia, and Micronesia. These islands, with Australia, New Zealand, and the rest, make up Australasia.

HOW FAR-AWAY ISLANDS ARE LINKED BY CABLES AND STEAMSHIPS

Fifty years ago, the journey to the Fiji Islands was indeed a long and trying one. First it took months to get to Australia, and then weeks in another and smaller ship to the islands. Now all Australasia and Oceania—as the groups of islands are called—is drawn near together and to the rest of the world by electric cables and swift steamships. From the north of Auckland, a cable runs to Norfolk Island, Fiji and Fanning Island, to Vancouver and British North America, across the Pacific. There is also a line from New Zealand to Sydney. One travels from Auckland to England in a month, changing ships at Sydney or Fiji, then to Vancouver, and by the Canadian Pacific to the Atlantic. Steamers to London take about six weeks.

The next story of Countries is on page 1545.

HOW THE FAIRY TALES WERE TOLD

IN olden times people were more superstitious than they are to-day, and readier to believe in unnatural and supernatural beings, so that accidents, misfortunes, and "lucky" events were supposed to have been brought about by spirits or by creatures who had the power of making themselves visible or invisible as they chose. Such creatures were the fairies, the brownies, the goblins, and the gnomes. Of course, there was no end to what these fairy-folk could do, and in lonely country places everybody would have some tale about them which he thought to be true. Thus was created what we call folklore, or the simple stories told by the countryfolk of all lands. Out of this folklore many fairy tales have come, and no one knows who told them first, as they existed for long centuries before people wrote stories down and signed them with their names. Even famous tellers of fairy tales have often been content merely to relate some of these old stories, and not to invent new ones.

WRITERS OF THE FAIRY BOOKS

IN that marvellous city which is itself a fairy story, Venice, whose grand old palaces and magnificent churches seem to rise up amid the shallow salt waters by the Adriatic Sea as if at the touch of some great magician's wand, there lived in the early years of the sixteenth century a man named Giovanni Francesco Straparola.

We know very little about this Straparola, except that he was a writer of stories. In those days Venice was the wonder of the world, and all sorts of clever men were drawn to the town because of its riches, and the splendid company to be found there.

Straparola was a clever Italian who had gone there doubtless because it was a famous place for printing books; and there, for many years, in some unknown house by the side of some old canal this man with the strange-sounding name wrote his stories and got them printed in that lovely city of the sea.

All the stories that he wrote cannot be called fairy tales; but as he drew very largely from folklore, most of them are pure fairy stories. It was a later writer who wrote the story of "Puss in Boots," yet Straparola had told the tale before him, though his Puss wore no boots.

Towards the end of the seventeenth century, and in the early years

CONTINUED FROM 1308



of the eighteenth, "the pleasant land of France" was noted for its writers of fairy tales. It was then that "Blue Beard," "Little Red Riding Hood," "The Sleeping Beauty," "Mother Goose,"

"Beauty and the Beast," and many another of our old favourites first took the form in which we know them to-day. The two great writers of fairy stories at that time were a Parisian named Charles Perrault, and a French countess, Madame D'Aulnoy. And now we see how grateful we should be for many of our happiest hours to that forgotten Straparola, when we are told that both Perrault and the countess got most of their ideas from his writings.

He must have been a kindly old gentleman, this Monsieur Perrault—who was busy with the affairs of State, being the official in charge of the Royal buildings, and a member of the great French Academy—to have found time and delight in telling his own children these charming stories, and then writing them down for the children of all the world. He was nearly seventy years of age when his principal book of fairy stories appeared, and in dedicating it to one of the young princes of France, he made believe the stories were told by one of his own children, which was only a pretty device for commending

them to other young folk ; for Perrault, though a very learned scholar, was not ashamed to set the fashion of writing fairy stories, which now became very popular with the ladies and gentlemen of leisure. The proper title of his book was "Stories or Tales of Past Times," but it had another and better title, "Tales of Mother Goose."

THE GRAND LADY WHO WROTE THE TALE OF CINDERELLA

One of the many grand ladies who lived in France at the same time as Perrault and amused themselves by writing stories was Madame D'Aulnoy. Every time that Christmas comes round and they are playing pantomimes at the theatres, her stories, like those of Perrault, are used throughout our land for this form of entertainment. "The White Cat," "The Yellow Dwarf," "The Fair One with the Golden Locks," "Cinderella," and many another nursery favourite was shaped by her pen from the earliest tales of Straparola. There were many other ladies who, about the time of Madame D'Aulnoy and somewhat later, practised this delightful art of weaving fairy tales, but none of them calls for notice, and as they all borrowed from that little-known writer who plied his pen by the sparkling waters of Venice, a hundred years before them, our thanks for the pleasure of these old tales are perhaps more due to him.

The names of the authors of whom we have been reading may be unknown to all our readers, but we come now to those whose names are familiar to every one of us.

THE BROTHERS GRIMM, WHO WROTE DOWN THE GERMAN FAIRY STORIES

What delight is associated with the otherwise forbidding name of Grimm ! "Tom Thumb," "The Queen Bee," "Hansel and Gretel," "The Frog Prince," "Rumpelstiltskin," and ever so many other stories that boys and girls for nearly a hundred years now have been reading with endless entertainment, were all written down by two brothers named Grimm, who lived in Germany during the first half of last century. Jacob Grimm was the elder of the two brothers, being born at the town of Hanau on January 4, 1785, while his brother Wilhelm was born on February 24, 1786.

These two brothers were probably not in the least like the sort of people

one would expect to be fond of telling fairy tales. As a matter of fact, they were sober, industrious scholars whose whole lives were devoted to literary studies and teaching, both of them becoming professors at the university of Berlin. Grave and learned gentlemen they were, whose greatest concern was to produce books of a kind that only students read, and yet they quite unconsciously made themselves famous for ever by collecting the old German fairy stories into a book, which has been translated into all the principal languages of the world, and has made the name of the brothers Grimm as well known in England and America as it was in their native land.

They went out together, these two industrious scholars, among the country-people of Germany, and induced them to tell such stories as they knew of the fairies. What a charming occupation, and how delightful were the results !

HANS CHRISTIAN ANDERSEN, THE LONG AND LANKY COBBLER'S SON

The other name that stands beside the Grimms, in fame is that of Hans Christian Andersen, the great Danish story-teller, who is really a much abler writer than the Grimms. Hans Andersen was certainly one who knew the fairies, as most of his wonderful stories—such as "Little Klaus and Big Klaus," "The Little Mermaid," "The Tinder-Box," "The Wild Swans," "The Ugly Duckling," and "The Snow Queen"—were told to him not by the peasant-folk, but by the fairies of his own brain. We might almost say that while Hans Andersen knew the fairies, the Grimms, and the others we have spoken about, only knew the folk who knew the fairies.

A wonderful and a strange man he was, this Hans Christian Andersen. The son of a poor cobbler, he was born in the year 1805 in the ancient city of Odense, in Denmark. The poor cobbler was a learned man in his way, and used to read books at night with his son Hans, who was growing up a long, lanky lad. But neither his father nor mother were sufficiently strict about his attending school, so that, as a boy, his education was very irregular. He was perhaps more sensitive than most children, being of a nervous, highly-strung nature, and his mother found it necessary to arrange at the first school he attended that he should never be

HANS ANDERSEN'S DREAM OF FAIRYLAND



Hans Christian Andersen was the greatest of all the writers of fairy tales. His mind was like a wonderland thronged with fairy folk, and in his stories he has told us what these little people of his dreams could do. Here we see him seated in thoughtful mood, while many of the fairies to whom his pen has introduced us are busy in the air about him. If we read his stories we shall know all these quaint little beings as though they were old friends.

punished. One day when the teacher, forgetting this, gave him a slight tap with the rod, he immediately took up his books and slate and marched off home. His mother then sent him to another school, where, among the scholars, was a tiny girl who told Hans once that her ambition was to be a dairymaid at a large country house.

WHAT HAPPENED WHEN HANS ANDERSEN TOLD HIS FIRST FAIRY TALE

"You shall be a dairymaid at my castle when I am a gentleman," said the boy in jest, and he drew upon his slate a rough picture of what his castle was like. The little fairies of the brain were already at work prompting him to tell strange stories about himself. So he went on to assure the little scholar that he was really of noble birth, but that the fairies had changed him in his cradle. The girl was very matter-of-fact, and she only replied to his fanciful tale by turning to some playmates and exclaiming, "He is mad, like his grandfather." Alas, it was true his grandfather was weak-witted, and this unhappy reception of one of his earliest efforts to tell a fairy story must have filled the sensitive boy with dread.

It would be quite a long story if we were to follow the incidents of Hans Andersen's life, though everything concerning this strange genius would be well worth telling. We can only, however, mention a very few of the facts of his life. His father died when the lad was eleven, and even at that age he had made very poor use of his schooling, dreaming and idling his time away.

HOW HANS ANDERSEN WENT OUT TO MAKE A FORTUNE, AND WHAT HE DID

It was not very long before he had a stepfather, and soon he had to think of making his way in the world by going to Copenhagen, the capital of his country. It was all because of having appeared on the stage of the theatre at Odense in a very tiny part in "Cinderella," and having written a boyish play which he thought good enough for the stage, that long, dreamy Hans, the laughing-stock of all the lads of Odense, set off on the coach with a little bundle packed by his mother and the sum of only nine dollars in his pocket to seek fame and fortune in Copenhagen; but many a sad and hungry day he was to have before he was famous, and even

after his name was known throughout Europe he was so poor a man of business, and made so little money from his stories, that he had grown into an old bachelor before he could have afforded to marry. So he never had any children of his own to listen to his fairy tales, which have charmed the children of all the world. Nor did he think so much of these tales himself at first. His ambition was to be a great dramatist or novelist or poet. Some success he had in each of these branches of the literary art, and indeed, for a time, was very famous as a novelist.

His fairy stories were written at first to please his own fancy or to entertain the children of friends in Copenhagen; but, you see, it was fairy stories the world wanted him to write, and although his novels and poems, as well as his plays, are seldom read by anyone now, the world will never let the fairy tales of Hans Christian Andersen, the poor cobbler's son, who died in 1875, be forgotten.

NATHANIEL HAWTHORNE, WHO WROTE "THE WONDER BOOK"

One of the greatest of the world's writers of fairy tales lived and died in one of the pleasantest parts of America, in New England, and he it is who next claims our attention—Nathaniel Hawthorne. He, too, was born in an old-fashioned town and lived among old-fashioned people; for Salem, in the State of Massachusetts, some fifteen miles distant from the great city of Boston, was one of the old homes of the Puritans. It was there that Hawthorne was born in the year 1804. His ancestors for generations had been seafaring folk, and his own father never returned from one of his long and dangerous voyages.

Nathaniel seems to have been an imaginative, sensitive boy, proud of his brave forefathers and his beautiful mother. He entered into all sorts of boyish games, but meeting with an accident while playing ball, was crippled for a time, and during those days he became a great reader. He was very fond of "The Faërie Queene" and "The Pilgrim's Progress." A little later he had another illness, and had to stay so long an invalid that he could only pass his time in book-reading. But his accident and his illness were not

altogether misfortunes if they stored his young mind with so much of what is best in English literature. When he himself came to write down stories of the people he had known and the life of old Salem, the richness of his mind, as the result of his early reading, was seen in the beauty of his literary style.

Nathaniel Hawthorne had written a great many beautiful stories before he began the book which should endear his name to all young people and entitles him to come into our little company of those who knew the fairies. This is called "The Wonder Book," and it is surely one of the most delightful series of fairy stories ever written.

THE STRANGE OLD LEGENDS OF GREECE TOLD OVER AGAIN

The author's own children were just tiny tots when he wrote "The Gorgon's Head," "The Three Golden Apples," "The Dragon's Teeth," and ten other stories that every boy and girl must read. They tell over again with a wonderful freshness, and in a way that is altogether unique, the strange old legends of Greece. As soon as he wrote these stories he read them to his own children, and so keen were they to hear and clever to remember, that they could repeat most of "The Wonder Book" by heart before it was printed.

For grown-up readers Nathaniel Hawthorne wrote one of the greatest novels, which he called "The Scarlet Letter," and it is for this he is chiefly famous. He was for some years the American Consul at Liverpool, and he died at the town of Plymouth, in New Hampshire, in the year 1864.

THE STORY-TELLERS OF IRELAND, A REAL HOME OF FAIRIES

Ireland is a real home of fairies, the Irish people having had in the old days far more stories of "the wee folk," as the fairies are often called, than the English. So it is surprising that there are not many Irish story-tellers to mention in the present company. Perhaps Thomas Crofton Croker, who was born in 1798, and died in 1854, is the most notable of those who, like the brothers Grimm, collected and recorded the folklore of his country. He wrote a fascinating book called "The Fairy Legends and Traditions of the South of Ireland," which we know that that great and famous

writer of romance, Sir Walter Scott, took great delight in reading.

But more interesting than Croker and a closer friend of the fairies—for they must have come to her, as she could not go to them—was a blind Irish lady named Frances Browne, who wrote "Granny's Wonderful Chair." The fairy stories told from Granny's wonderful chair are full of delicious fancy and bright with pictures of Nature. Yet it would not be too much to say that there is nothing so wonderful about them as the fact that their gay and lively scenes could have been described by a poor woman whose eyes had never looked upon the beauties of Nature. Frances Browne was blind from infancy, but she must have had that "inner vision" which enables its possessor to see into the mysteries of life with the eyes of the soul.

A wonderful figure in every way was this poor Irish woman, and since she had not the use of her eyes, she developed the use of other faculties. For example, while her brothers and sisters were saying their lessons aloud for the next day at school, she would learn their lessons by heart, and to induce them to read to her, she began inventing stories from her own imagination.

THE BLIND IRISH LADY WHO WROTE "GRANNY'S WONDERFUL CHAIR"

When only seven years of age Frances Browne had composed a poem, but at fifteen she was so impressed with the wonderful music of Homer's "Iliad," when that was read to her, that she had her own poor childish efforts destroyed, and did not again attempt to compose poems until she was twenty-four. From that age onwards, she composed much charming verse and many stories, removing from her Irish home to Edinburgh, where she became a busy contributor to the magazines.

"Granny's Wonderful Chair" she wrote in 1856, after settling in London, and it immediately became the favourite fairy-story book of the day. Her last novel was written in 1887, when she was seventy-one years of age; and the life of Frances Browne, though one of comparative poverty, was rich in the pleasures of the imagination and in the joy her fairy stories have brought, and still bring, to multitudes of readers.

That fine novelist and splendid type of the Christian gentleman, Charles

Kingsley, might be included here, for did he not write "The Water Babies," which he must have had from the fairies? And John Ruskin also, for he wrote "The King of the Golden River," a perfect fairy tale. But we shall have to speak of them among the writers of the great books, and so we pass to one who is surely the greatest of all our modern explorers of fairyland—none other than the creator of "Alice in Wonderland."

THE CLEVER STORY-TELLER WHO FIRST TOOK US ALL TO "WONDERLAND"

On the title-pages of his books we know this most celebrated of modern fairy-story tellers as "Lewis Carroll," but in real life he had a very different and much less attractive name—Charles Lutwidge Dodgson. We will only think of him as Lewis Carroll, however, as it was under that name, just forty years ago, he became the favourite story-teller for boys and girls.

Everybody, of course, has read "Alice in Wonderland," and perhaps his other fairy books as well—"Through the Looking-Glass," "The Hunting of the Snark," and "Sylvie and Bruno." It is quite unnecessary to recall the name of the many strange characters, such as the Mad Hatter, Tweedledum and Tweedledee, the White Rabbit, and all that varied throng with which every boy and girl loses no time in making acquaintance.

But what sort of man was he from whose brain of teeming fancies these strange and delightful creatures came? Should we picture him as a jolly, middle-aged gentleman, leading a life free from care, and happiest with his children round his knees, telling stories?

"LEWIS CARROLL" AND LITTLE ALICE, THE DEAN'S DAUGHTER

Such a picture would be curiously incorrect, for Lewis Carroll was in certain ways as strange a character as some of his own fairy folk. In the first place, he was, of all things in the world, a mathematician, and lectured at Oxford University on that science which is the terror of most young scholars. Perhaps it was because he spent so much time over difficult problems in mathematics that he liked to clear and refresh his brain with humorous thoughts and happy fancies, which he turned into the shape of fantastic

stories for the amusement of the children of his friends.

Perhaps he was just a little "moody," being sometimes rather a dull companion to grown-ups, and although he was sixty-six years of age at the time of his death, on January 14, 1898, he had never been married. But though he was an "old bachelor" for many years before his death, he was a comparatively young one when he wrote his immortal story of "Alice's Adventures in Wonderland," first published in 1865. It is very interesting to know how he came to write this story. There really was a little girl named Alice, one of many little girls who were delighted when Lewis Carroll came to visit their parents, as they had never any difficulty in getting him to tell a story. The real Alice was a daughter of Dean Liddell, and she herself has told us how the wonderful story was first begun.

HOW LEWIS CARROLL TOLD ALICE A STORY ON THE RIVER BANK

We cannot do better than let the words of the real Alice be heard again. "Most of Mr. Dodgson's stories," she says, "were told to us on river expeditions to Nuneham or Godstow, near Oxford. My eldest sister, now Mrs. Skene, was Prima, I was Secunda, and Tertia was my sister Edith. I believe the beginning of 'Alice' was told one summer afternoon when the sun was so burning that we had landed in the meadows down the river, deserting the boat to take refuge in the only bit of shade to be found, which was under a new-made hayrick. Here from all three came the old petition of 'Tell us a story,' and so began the ever-delightful tale.

"Sometimes, to tease us—and perhaps being really tired—Mr. Dodgson would stop suddenly and say, 'And that's all till next time.' 'Ah, but it is next time!' would be the exclamation from all three, and after some persuasion the story would start afresh. Another day, perhaps, the story would begin in the boat, and Mr. Dodgson, in the middle of telling a thrilling adventure, would pretend to go fast asleep, to our great dismay."

Is not that a pretty story of how the gate was open that leads us into Wonderland? Lewis Carroll himself has told us of that afternoon when little Alice Liddell and her sisters

THE FIRST TELLING OF "ALICE IN WONDERLAND"



"Lewis Carroll" became famous chiefly because he had three little friends, one of whom was named Alice, who were always asking him to "tell a story." One day he began to make up a story of strange happenings in Wonderland, when he had gone for a picnic up the river with his little friends. That story was the beginning of "Alice in Wonderland," and years later, when he wrote it down and published it, it made his name known for ever.

first induced him to begin describing Wonderland, for at the beginning of his book we read of it in these lively verses ;

All in the golden afternoon
Full leisurely we glide ;
For both our oars, with little skill,
By little arms are plied ;
While little hands make vain pretence
Our wanderings to guide.

Ah, cruel Three ! In such an hour,
Beneath such dreamy weather,
To beg a tale of breath too weak
To stir the tiniest feather !
Yet what can one poor voice avail
Against three tongues together ?

Anon, to sudden silence won,
In fancy they pursue
The dream-child moving through a land
Of wonders wild and new,
In friendly chat with bird or beast,
And half believe it true.

And ever, as the story drained
The wells of fancy dry,
And faintly strove that weary one
To put the subject by,
"The rest next time." "It is next time !"
The happy voices cry.

Thus grew the tale of Wonderland ;
Thus slowly, one by one,
Its quaint events were hammered out—
And now the tale is done ;
And home we steer, a happy crew,
Beneath the setting sun.

HOW LEWIS CARROLL FOUND A GIRL READING "ALICE" IN THE TRAIN

We could go on to tell so many stories about this dear friend of the little girls that there would be no space left for all the other people that must come into this book, and, indeed, a large book has been written about his life ; but one little story we must find room for. He was travelling in a railway carriage one day with a lady and her little daughter, neither of whom he knew. The girl was reading his famous book, and he, who always pretended that Mr. Dodgson was no relation of Mr. Lewis Carroll, began talking to the little reader about "Alice in Wonderland." At this her mother joined in and said :

"Isn't it sad about poor Mr. Lewis Carroll ? He's gone mad, you know."

"Indeed," said the astonished author, "I had never heard that."

"Oh, I assure you, it is quite true ; I have it on the best authority !"

A few days later the little girl received a copy of "Through the Looking-glass" inscribed with her name and the words : "From the author, in memory of a pleasant journey."

It was not only to the little girls that Lewis Carroll told his stories. Little boys also were his friends, and one of these was named Greville Macdonald, whom he almost convinced on one occasion that it would be an excellent thing to have a marble head, as he would not need to comb his hair !

GEORGE MACDONALD, AND THE MEN WHO WROTE "BRER FOX" & "MR. TWO-LEGS"

The father of this lad was a very famous man, a great preacher, the author of many fine novels, a poet. His name was George Macdonald. He, too, was one who knew the fairies. Though he did not invent such strange and comic characters as Lewis Carroll has imagined for us, yet he wrote many books of fairy tales—"At the Back of the North Wind," "The Princess and the Goblin," and many more. Only four years ago his son Greville, who is now a well-known physician and has long known how impossible it is to have a marble head, prepared a new edition of his father's famous fairy stories. George Macdonald was born in the north of Scotland in 1824 and died in 1905.

There are, of course, many other fairy-story tellers. Joel Chandler Harris, our American writer, who was born in 1848, and died on July 4, 1908, told those wonderful negro tales of "Uncle Remus," in which Brer Fox and Brer Rabbit and the Tar Baby have such wonderful parts to play ; and Carl Ewald, a Danish schoolmaster, born in 1856 and died in 1908, who wrote "Mr. Two-Legs," and some seventy other fairytales. When we have mentioned them, we have noticed most of those who knew the fairies.

THE BEST OF ALL THE FAIRY PLAYS, "PETER PAN"

Though, after all, we may be asked, "What about 'Peter Pan' ?"

Certainly, Mr. J. M. Barrie, the writer of that most charming of all the fairy plays, knows the little folk as well as any we have mentioned ; but, of course, he is famous for many other things than the writing of "Peter Pan."

Let us hope the time will never come when great authors may not think it worth their while to tell any more stories of the fairies, for we may be sure there never will be a time when boys and girls will not be ready to listen to them.

The next stories of Men and Women begin on page 1585.



FAMOUS AMERICAN WRITERS

ALTHOUGH the great writers of America—by which, of course, we mean the United States—belong, in a way, to the field of English literature, for Britons and Americans are linked together by the English tongue, there are many reasons why we should consider the great poets and story-tellers of our own land separately from those of England. Descended though most of them were from British colonists, the different conditions of life in America naturally affected the native authors, giving to their writings a character which, if not at first greatly different from that of English literature, has steadily grown more marked, until American literature is now in many ways distinct from that of England.

It is extremely interesting to watch the growth of a literature in the younger countries of the world. At first, in these far lands, where people have to work hard for a living, building log-cabins in clearings of the forests, toiling to make the land fruitful, founding new townships, they have no time to cultivate literature, little even for reading. Then, as they grow richer and more settled, as the little villages blossom into thronging cities, and the people



can turn their minds to other things than the mere labour of the day, men begin to write in their leisure; the whole community begins to read what the few are writing. Thus is a native literature born; and it will be found

that, though the first writers are likely to imitate familiar models, they will write of things peculiar to their own land, while other writers will arise who will discard all models and endeavour to express themselves in new and striking ways.

So it has happened in this case. American literature is the daughter of English literature, and just because the Americans have been an independent people for over a hundred years, so is their literature a very independent daughter!

Here we are concerned only with the most famous writers whose works have added lustre to the American name, and who, though lacking the genius of the greatest English writers—for America has no Shakespeare, no Milton, no Tennyson, no Scott, no Byron, no Burns—are still worthy to rank with many names that are great in English literature.

We shall not go back so far as the renowned Benjamin Franklin, who, though celebrated as a journalist, as

a statesman, and as a scientist, and one of the fathers of the United States, is not a great figure in American literature. The first writer in whom we are interested was born in the auspicious year of 1783, when Britain recognised the independence of the United States. His name was Washington Irving, and April 3 was his birthday. His father had come from Scotland, his mother claiming Cornish ancestry, and when we know that in his boyhood his favourite reading was found in the poems of Chaucer and Spenser, we can see that he was really a Briton born beyond the sea.

WASHINGTON IRVING, ONE OF THE FIRST WRITERS OF AMERICAN LITERATURE

Irving was in a lawyer's office when, at nineteen, he began writing little humorous articles in a paper edited by his brother. His health showing signs of weakness when he was twenty-one, he came over to England and the Continent for a long holiday, which did him so much good that he lived to be nearly seventy-seven. As a boy, he must have been of a very quiet and gentle nature. "Books of voyages and travels became my passion," he writes, "and, in devouring their contents, I neglected the regular exercises of the school. How wistfully would I wander about the pier-heads in fine weather and watch the parting ships bound to distant climes! With what longing eyes would I gaze after their lessening sails, and waft myself in imagination to the ends of the earth!"

When he returned to New York, he became a lawyer, but, instead of practising law, joined one of his brothers and a friend in starting a journal, which proved so successful that he determined to devote himself to a literary life.

THE AUTHOR OF "THE SKETCH BOOK" AND "RIP VAN WINKLE"

The most important period of his literary work began in 1815, when he paid his second visit to Europe, a visit that lasted for no less than seventeen years. Here he wrote that charming work "The Sketch Book," which contains some of the most beautiful descriptions of historic places ever penned.

His gift of making the description of a place alive with human interest, and awakening in the mind of the reader that tender feeling which comes from the memory of a happy visit to some

interesting spot, was quite unrivalled; and now, more than eighty years after "The Sketch Book" was written, it is still widely read in Great Britain, as well as in his native country.

Irving's last great work was the "Life of Washington," our great hero, which he completed only a few months before his own death on November 28, 1859. Washington Irving, after all, was really more English than American in the character of his writings. He excelled equally as a historian, a descriptive writer, and a teller of tales, for his short story of "Rip Van Winkle," which is told again in THE CHILD'S BOOK OF STORIES, was surely one of the world's masterpieces.

The next name to engage our attention is one that young readers of several generations have delighted to greet, and many a grey-head will remember with pleasure. James Fenimore Cooper, who was born at Burlington, New Jersey, on September 15, 1789, was in every way more American than Washington Irving. His ancestors had come from England two hundred years before he was born, so that he was essentially a son of America.

FENIMORE COOPER AND HIS TALES OF REDSKINS AND PIRATES

His father was a judge, and the youth enjoyed many advantages, being well educated at grammar schools and Yale College, before he went to sea in 1806. After two years in the merchant service he joined the United States Navy, and served in it until 1811, when he married and took up the management of the property he inherited.

For nine years he engaged in the pleasant life of a gentleman farmer, and had no notion at all of bidding for fame as an author. But, happening one day to read a story which he thought very poor, he asserted that he could do better himself, and, half in fun, sat down to the writing of his first book. The title of this was "Precaution," and, although it is on the whole a very ordinary story, his friends seemed to like it. So he determined to become an author. This was in 1820. During the next year he published "The Spy," a brisk and racy tale of the Great Revolution, and he found himself popular as a storyteller on both sides of the Atlantic.

THE HOMES OF COOPER AND IRVING



James Fenimore Cooper wrote many interesting tales of the sea and of Indian life. His most famous books are the Leatherstocking Tales, with which most of our boys and girls are acquainted. Here is a picture of his home, Otsego Hall, at Cooperstown, N. Y., where he wrote his novels and where he died.



Washington Irving loved the region around Tarrytown, New York, which he immortalized in the Legend of Sleepy Hollow. His house, Sunnyside, still stands and is an object of interest to all who have felt the charm, through his writings, of the spirit of the author, which we may fancy still clings about the place.

From that day onward he seems to have written a novel almost every year of his life, and his knowledge of the sea and the Indians—Red Indians of his native land—was turned to great advantage in such stirring romances as "The Pilot" and "The Last of the Mohicans." Seven years of his life were spent in Europe. He is described as possessing a "manly figure, high, prominent brow, clear, and fine grey eyes, and royal bearing," which revealed "the man of will and intelligence."

We are told by one who knew him that he was not a "lovable" man, though he was one who commanded respect. It is the lovable men, however, whom we like to remember. But if Cooper, as a man, has not a very warm place in our affections, there can be few readers who do not owe him thanks for many a happy hour spent with his stories of adventure among the Indians, or his salty yarns of the sea. He died at Cooperstown on September 14, 1851.

WILLIAM CULLEN BRYANT, THE FIRST FAMOUS POET OF AMERICA

The poet William Cullen Bryant comes next on America's literary roll of fame. In the course of his life magic changes had taken place in the United States. For though he was born only eleven years after the recognition of American independence, when the towns of "New England"—as his native part of the United States is still known—were quiet little pastoral villages of the old English type, when he died, in 1878, the enormous industrial developments, which has made the United States a land of teeming cities and almost inestimable wealth, were already in full tide.

He was the son of a widely respected physician at Cummington, Massachusetts, and was born on November 3, 1794. His father was a man of refined taste, a lover of books, so the boy had early encouragement to turn his thoughts to literature. But perhaps it was also fortunate that his father was a physician, as we are told that William was of delicate health, and his head seemed much too large for his body. His father, therefore, had him thoroughly dipped every summer morning in a brook that ran near the house, and in the autumn days the ice on the water had sometimes to be broken before the boy could have this bath! It may have

been due to this Spartan treatment that, after he reached manhood, he never again was troubled with delicate health.

We have read of many clever children, but surely there have been few who knew all the letters of the alphabet when only sixteen months!

A BOY WHO KNEW THE ALPHABET BEFORE HE WAS TWO

Bryant is credited with this feat of childhood, and when he was ten years old he had already begun to write poetry, which was soon after printed in one of the country papers. The youthful poet read for the law, and, passing in 1815 as an attorney, for the next nine years or so drudged as a lawyer.

Cullen Bryant was just turned thirty, and had been married for some four years, when he gave up his work as a lawyer to devote his life to literature, and in 1825 he settled in New York as editor of the "New York Review." This was a short-lived journal, but his next editorship was that of the "New York Evening Post," and this he retained to the end of his days, filling the position for nearly fifty years.

There is no doubt that, although so much of his energy was expended on daily journalism, Bryant was not only the first of America's notable poets, but one of her writers who is long likely to be remembered. In all his verses there is an intense love of Nature, and, indeed, his feeling for Nature would seem to have been stronger than his human sympathy, the result being to leave his readers a little cold in their affection towards the poet. It is said of him that his wife was his only really intimate friend, and when she died he had no other. But it is pleasant to read of the poet at his country home stopping his gardener from sawing off the branch of a tree when he discovered a bird's nest on it. He had the branch carefully tied up until the little creatures who were born there were able to fly. He died at New York on June 12, 1878.

RALPH WALDO EMERSON, THE FIRST GREAT AMERICAN PHILOSOPHER

The next name to attract us as we turn over the life-stories of America's great men is one of far wider fame than any of those we have been considering. Ralph Waldo Emerson may be described as a master-mind of America, one of the finest flowers of our native

intellect. He, too, was a New Englander, born at Boston on May 25, 1803. He was one of five children left fatherless in 1811 by the death of the Rev. William Emerson, a highly respected minister, whose widow was a woman of character and resource.

Poor Mrs. Emerson did her best to provide for the children, but Ralph and his brother Edward had at times only one overcoat between them, so that their schoolfellows would ask: "Whose turn is it to-day?" The boys had to help in all sorts of household duties, and as they all seem to have been keen to acquire education, they had little time left for play. It was by the help of some friends that they were enabled to enter Harvard College, and even there Ralph waited at table to earn part of his board. There is no evidence that he was a particularly bright scholar, although he was clearly one of the most studious. After leaving Harvard he was a teacher for a time, and then in 1825 began studying for the ministry.

Four years later he became assistant, and, later, minister of the Second Church, Boston; but after three years, in which he had married and lost his first wife, he gave up his church, as his mind was troubled with doubts about the things he was expected to

preach. Then he went to Europe, and in England made many friends, becoming particularly intimate with that great thinker, Carlyle—a friendship that endured for forty years.

In 1834 he had returned to America, and married again, settling down in the town of Concord, where he began to write his "Essays" and to deliver the lectures which very soon made him famous as a teacher. Concerning Emerson's teaching, we may read something of interest in the pages of this book.

A STORY OF EMERSON AT THE FUNERAL OF LONGFELLOW

In his old age memory began to fail him, and he would even forget the names of his most familiar friends. One month before his own death, which took place at Concord on April 27, 1882, he attended the funeral of the poet Longfellow, when he remarked: "The gentleman we have just been burying was a sweet and beautiful soul; but I forget his name."

It was in the old town of Salem that Nathaniel Hawthorne, the greatest American novelist, was born, on July 4, 1804. Like Emerson and most of the great figures of American literature, he, too, was a New Englander. It is not necessary to say anything about him here, because we may read his life-story



LONGFELLOW WATCHING THE VILLAGE BLACKSMITH "UNDER A SPREADING CHESTNUT TREE"
The famous poem by Longfellow, beginning "Under a spreading chestnut tree the village smithy stands," appears on page 347.



YOUNG WHITTIER RECEIVING FROM THE POSTMAN THE NEWSPAPER WITH HIS FIRST POEM

on page 1470, in the "Writers of the Fairy Books," and he is only mentioned so that his place in this rally of great Americans may not appear vacant.

A schoolfellow of Hawthorne's was a boy three years his junior, who was to become the greatest of American poets. Henry Wadsworth Longfellow was born at the beautiful seaport town of Portland, Maine, on February 27, 1807, and came of distinguished parentage.

LONGFELLOW, THE MOST POPULAR OF ALL AMERICA'S POETS

His boyhood was full of happiness, due as much, perhaps, to his own gentle nature as to the prosperous circumstances of his parents. He early developed a love for the English poets, and was encouraged to read them, though his favourite reading was Washington Irving's "Sketch Book."

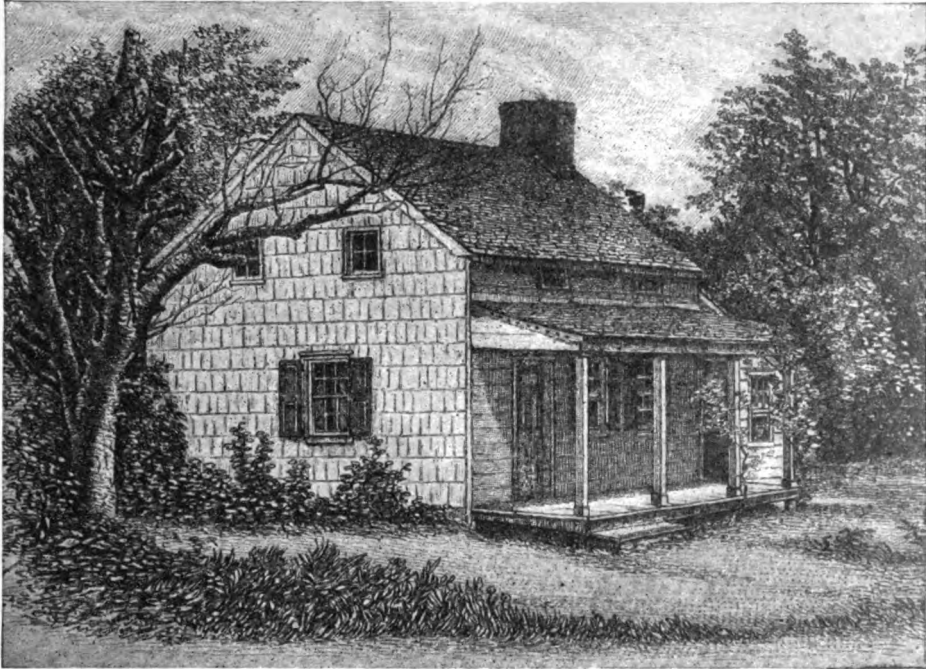
He was so brilliant a scholar that the trustees of his college offered to make him Professor of Foreign Languages if he would go to Europe to qualify for the position. So in 1826 he went to France, and afterwards to Spain, Italy, and Germany, studying the languages of these countries for three years, and then returned to America to take up his work

in 1829. He was very successful, and seven years later became Professor of Modern Languages at Harvard University, at Cambridge. Meanwhile, he had been writing much poetry, and translating both foreign prose-writers and poets. But it was not until two years after he had settled at Harvard that his first book of poems, "Voices of the Night," appeared. His second book was a prose romance, "Hyperion," published in the same year; and in 1841 came "Ballads and Other Poems," which included that famous poem, "The Wreck of the Hesperus," which we may read on page 97.

In 1843 the poet married a second time, the lady being the heroine of his story, "Hyperion"; and the smooth course of his life continued, though, after a time, even the light duties of his professorship began to tell on his somewhat feeble constitution. In 1861 the great tragedy of his life occurred; his wife was accidentally burnt to death.

The poet was broken-hearted, but bore up manfully, and through the evening of his days, when his hair had become snowy white, he continued to be the patient, gentle soul he had ever been. The character of the man is reflected in

THE HOMES OF TWO AMERICAN POETS



In this little cottage which still stands though somewhat altered in appearance in Fordham on the outskirts of New York City, Edgar Allan Poe wrote some of his best work. Here he watched his child wife die as much from want of proper food and clothing as from the terrible disease which finally claimed her as a victim.



Here is a picture of Longfellow's beautiful home in Cambridge, Mass., where he was a professor of modern languages in Harvard University. This house was built before the Revolution, and when Washington was in command of the American army in Boston, served as his headquarters. Thousands of visitors every year go to see it and the splendid elms in the yard.

his poetry, which is always tender in feeling and melodious. The most famous of his longer poems is "Hiawatha," that strangely beautiful story from the legends of the Indians, and perhaps the best known of his many shorter pieces is "The Village Blacksmith," printed on page 3472. Longfellow died at Cambridge, Massachusetts, on March 24, 1882, and two years later a bust in honour of this sweet singer of the English tongue was placed in the Poets Corner of Westminster Abbey.

In the same year as Longfellow, and in the same state, another great American poet, John Greenleaf Whittier, was born, on December 17, 1807. His boyhood was a harder time than that of Longfellow's, as he had to labour on a farm and to work at shoemaking in order to get the money to go for two terms of six months to the Academy of Haverhill, his native place. His parents were poor Quakers, and his father considered the boy's delight in writing verses a profitless pastime.

WHITTIER THE QUAKER POET, THE SWEET SINGER OF FREEDOM

The lad read the poems of Robert Burns, to whom he was doubtless drawn at the time by the fact that he also was a farm-worker. He was only about nineteen when one day, as he was mending a wall by the roadside in company with his father, the postman gave him a copy of a local paper in which he had the unexpected joy of reading one of his own poems. Quite unknown to him, his elder sister had sent this to the editor, and thus did the poet make his first appearance in print.

Soon afterwards he managed to get employment as a journalist, and for many years edited newspapers in different towns, and took an active part in the early days of the anti-slavery movement. Indeed, he has been called the "Poet Laureate of Abolition"—no unworthy title—as his poems did much to touch the conscience of the American people on the great question of slave employment. There is a feeling of sweetness and purity in all his poetry, a fresh and wholesome flavour that makes one feel it was written by a good man, and as his work is, so his life was. His books of verse were numerous, and consisted chiefly of short collected poems, of which "Maud Müller" and

"Barbara Frietchie," which we may read on pages 3271 and 4851, are the best known. His longest poetical work, "Snowbound," was published in 1866. The poet lived for many years after the triumph of the noble cause for which he had fought with his pen, dying at Hampton Falls on September 7, 1892.

EDGAR ALLAN POE, THE STRANGE MAN WHO WROTE "THE RAVEN"

No two lives could show a greater contrast than those of Whittier and Edgar Allan Poe, who was born on January 19, 1809, at Boston. In the matter of literary genius, there is very little doubt that Poe was a greater man than Whittier or even Longfellow, and, indeed, it is not too much to say that, in the realm of poetry, his is the most individual voice yet raised in America. His character lacked stability, and his short life was one of much sorrow and disaster, for which he was himself partly to blame. His parents were actors, and they were both dead when he was still a boy. He had the misfortune to be adopted by people of some wealth, who spoiled him by giving him too much of his own way, and allowing him too much pocket-money. He was at school in the north of London for some years while the friends who had adopted him were travelling on the Continent. Then, when back in America at college, although a brilliant student, he ran into debt and drank heavily.

Altogether the story of Poe's life is not a profitable one, and it would almost seem that his highly developed powers of imagination had robbed him of some of the more manly qualities which are a worthy recompense to people of duller minds. He led a struggling life as a journalist, and yet contrived to produce many poems and short stories which must always rank as masterpieces of their kind. "The Raven," which is printed on page 4263, is a good example of his strange, weird poetry.

THE DEATH OF POE, AND THE LIFE OF OLIVER WENDELL HOLMES

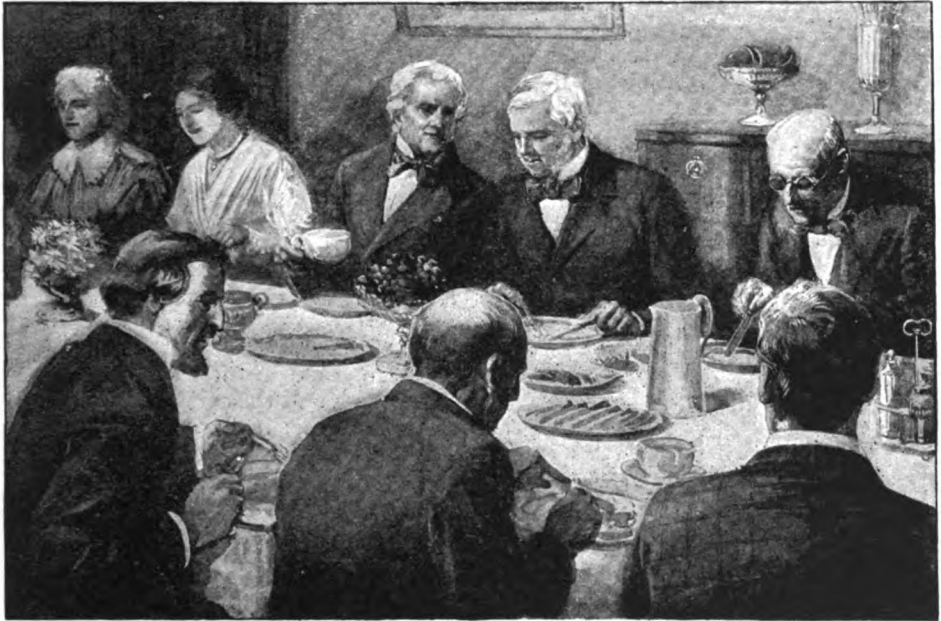
Even his literary criticisms, rapidly written for his magazine, have never been surpassed by the most deliberate work of any of his countrymen. Edgar Allan Poe died in Baltimore on October 7, 1849, as the result of taking a drug, and though his life was a sad one, and though he is a man for whom we cannot

feel very much love, we must admire the genius that gave us so many marvellous stories and melodious poems.

We turn again to a wholesome character and a beautiful life in the next New England writer who calls for notice. Oliver Wendell Holmes was born at Cambridge, Massachusetts, on August 29, 1809. The son of a minister, he received an excellent education, first studying for the law and then for medicine, taking his degree as a doctor of medicine at the late age of twenty-seven. Six years earlier his first poem had been published in a Boston paper, and now appeared his first book of collected poems.

loved for three of the pleasantest books one can read, in which he discourses in the most entertaining and instructive way on all sorts of subjects. These are "The Autocrat at the Breakfast Table," "The Professor at the Breakfast Table," and "The Poet at the Breakfast Table."

The first was written in 1858, and the last in 1872. Dr. Holmes will also be remembered for his many famous friendships, and when he died at Boston on October 8, 1894, it was felt that one of the most charming figures of American literary life had passed into the land of sunny memories.



OLIVER WENDELL HOLMES AT THE BREAKFAST TABLE

This picture represents the characters in "The Professor at the Breakfast Table." Holmes is the middle man facing us.

Literature for him, however, was only to be an avocation, not his means of life, for he built up a good practice as a doctor, and was professor of medicine at Harvard. He was the genial friend of all the famous Americans of his day; he had a bright and sunny nature, which kept his heart sweet throughout his long life, and in all that he wrote there is the light touch of a gay spirit and the sense of reverence as well; for though something of a gossip, he was saved from littleness by the sobriety of mind which he also possessed. Neither his poetry nor his prose fiction gives him high rank, but he will always be remembered and

We come now to the only lady writer of America whose name has a world-wide fame. Mrs. Harriet Beecher Stowe, born at Litchfield, Connecticut, on June 14, 1811, was the sister of a celebrated preacher, Henry Ward Beecher, and she married a minister who was a professor in the same college where Hawthorne and Longfellow had been students. She is described as "a small woman with pretty curling hair, and far-away, dreaming eyes, and a way of becoming occupied in what interested her, until she forgot everything else for the time."

Mrs. Stowe was forty years of age when she contributed to an anti-slavery newspaper in Washington the story

of "Uncle Tom's Cabin." Written out of her burning indignation at the oppression of the negro slaves in America, this story so caught the sympathy of the whole world that when it was finished the writer found herself famous.

MRS. STOWE AND HER FAMOUS STORY OF "UNCLE TOM'S CABIN"

Though lacking many desirable qualities of literature, it is still an intensely moving tale, and it is doubtful if any other story has ever been so widely read. Mrs. Stowe, in later life, travelled much in Europe and wrote many other books, but while some of these are better written than "Uncle Tom's Cabin," the fame of that story has eclipsed everything else from her pen. She died at the age of eighty-four at Hartford, Connecticut, on July 1, 1896.

A strange and not altogether lovable figure now commands our attention for the moment. The man who is so self-centred that he eschews the fellowship of other men, preferring to play the hermit, is seldom a creature to be admired. In saying this we need not be guilty of belittling the place of Henry David Thoreau among the sages of America. He was born at Concord, Massachusetts, on July 12, 1817, and at twenty years of age graduated at Harvard. He was a friend of Emerson, but we can only imagine his human friendships as being about as genial as the relationship of two marble statues!

Thoreau is credited with great skill as a maker of lead pencils—certainly a worthy occupation; but when, at the age of twenty-eight, he built himself a wooden shanty at Walden Pond, in the woods not far from his native village, and there pottered about by himself for fully two years, observing Nature and employing himself on odd jobs, under the impression that he was helping to solve the problems of life, we cannot consider him a particularly manly person.

THOREAU, WHO WROTE ABOUT HIS LONELY LIFE IN THE WOODS

Thoreau wrote a very charming book entitled "Walden," describing his life in the woods, and this, first published in 1854, is still the most popular product of his pen. Later, he showed some genuine spirit in his advocacy of freedom for the slaves, and in his public defence of John Brown, of Kansas. He made other

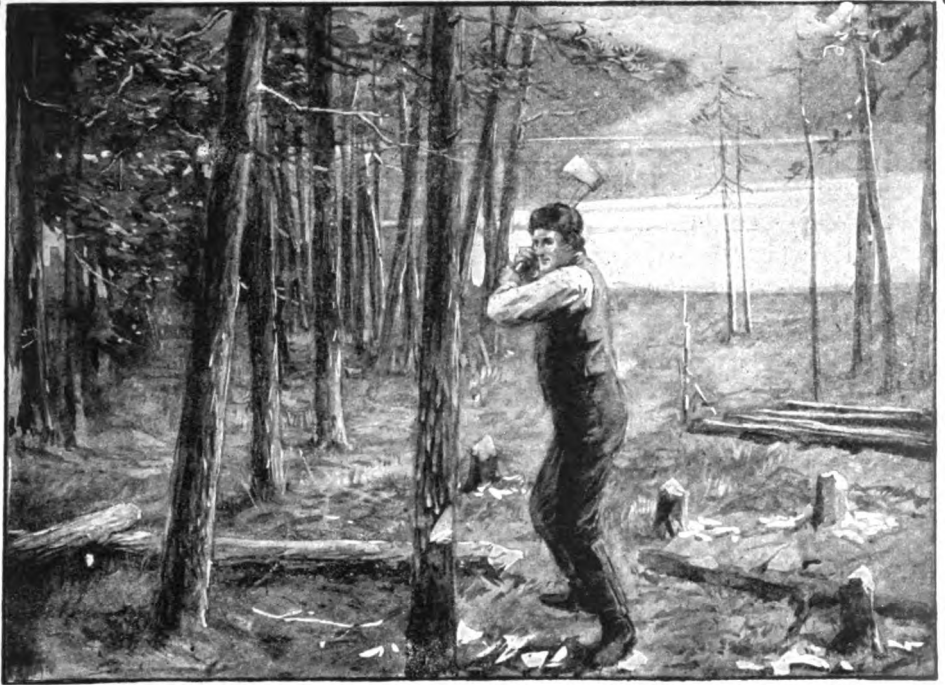
sojourns in lonely woods, where his quiet and brooding spirit was more at home than amidst the hum and bustle of life in the cities. He was friends, at least, with all the birds and squirrels, and with little children he could play with charming freedom, but his profitless love of solitary life is scarcely a thing to admire. The men we should most admire are those with a high courage to face their destiny on the common battlefield of humanity, or those who love their fellow-beings well enough to delight in the society of their kind. Still, Thoreau has many followers and many admirers, and though we may neither like the character of the man nor care for the starveling gospel he has preached, we cannot but admit the interest of his writings and his claim to a place among America's famous authors. He died at his native town on May 6, 1862, so that his study of Nature's ways and his observance of the "simple life" did not bring him length of days.

JAMES RUSSELL LOWELL, POET, SCHOLAR, HUMORIST, AMBASSADOR

Once again it is a New Englander that greets us in America's roll of fame. James Russell Lowell, born at Cambridge, Massachusetts, on February 22, 1819, owed much to the culture of his parents and the comfortable circumstances in which his early life was passed. He, too, was a distinguished student of Harvard. He was already a poet of some promise when he took his degree in law and set out to practise as a lawyer.

It was due to the influence of his sweetheart that Lowell gradually devoted himself to authorship instead of the law, for she also was something of a poet. He succeeded Longfellow as professor of Spanish and French at Harvard in 1855, having previously equipped himself for the post by a stay in Europe to further his studies, and for twenty years he devoted himself to this work and the writing of literary criticism.

He was also editor of important American reviews, and in 1877 his country honoured him by sending him as ambassador to Spain, and afterwards to England. In 1885 he went back to his native town, and there continued his literary labours until his death, on August 12, 1891. Lowell is eminent among Americans as a great scholar; he had a profound knowledge of books,



THOREAU FELLING TIMBER FOR HIS WOODLAND HUT AT WALDEN POND

and wrote about them with rare charm in such works as "Among my Books" and "My Study Windows." He was a poet with real feeling for romance and an original touch of humour, his "Biglow Papers" taking eminent rank in American humorous poetry.

Although Lowell was in his seventy-third year at the time of his death, somehow we do not think of him as a veteran, and are apt to recall the impression of the poet in the prime of his manhood.

WALT WHITMAN, A HERO AMONG MEN AND A SINGER OF STRANGE SONGS

On the other hand, his compatriot, Walt Whitman, is a type of the venerable old man of letters, and was long known as "the good grey poet." Yet Whitman was only a few months older than Lowell when he died. He was born at Long Island, New York, on May 31, 1819, and died at Camden, New Jersey, on March 27, 1892. Whitman was as unlike Lowell in every respect as any two fellow-countrymen could be. But, then, he was unlike every other poet, both in individuality and in what he wrote; indeed, some boys and girls must be rather surprised to read one of his poems and be told it was meant for poetry. For instance, lines like these

are not of the usual kind we read in books of verse :

Oh, to make the most jubilant song !

Full of music—full of manhood, womanhood, infancy !

Full of common employments—full of grain and trees.

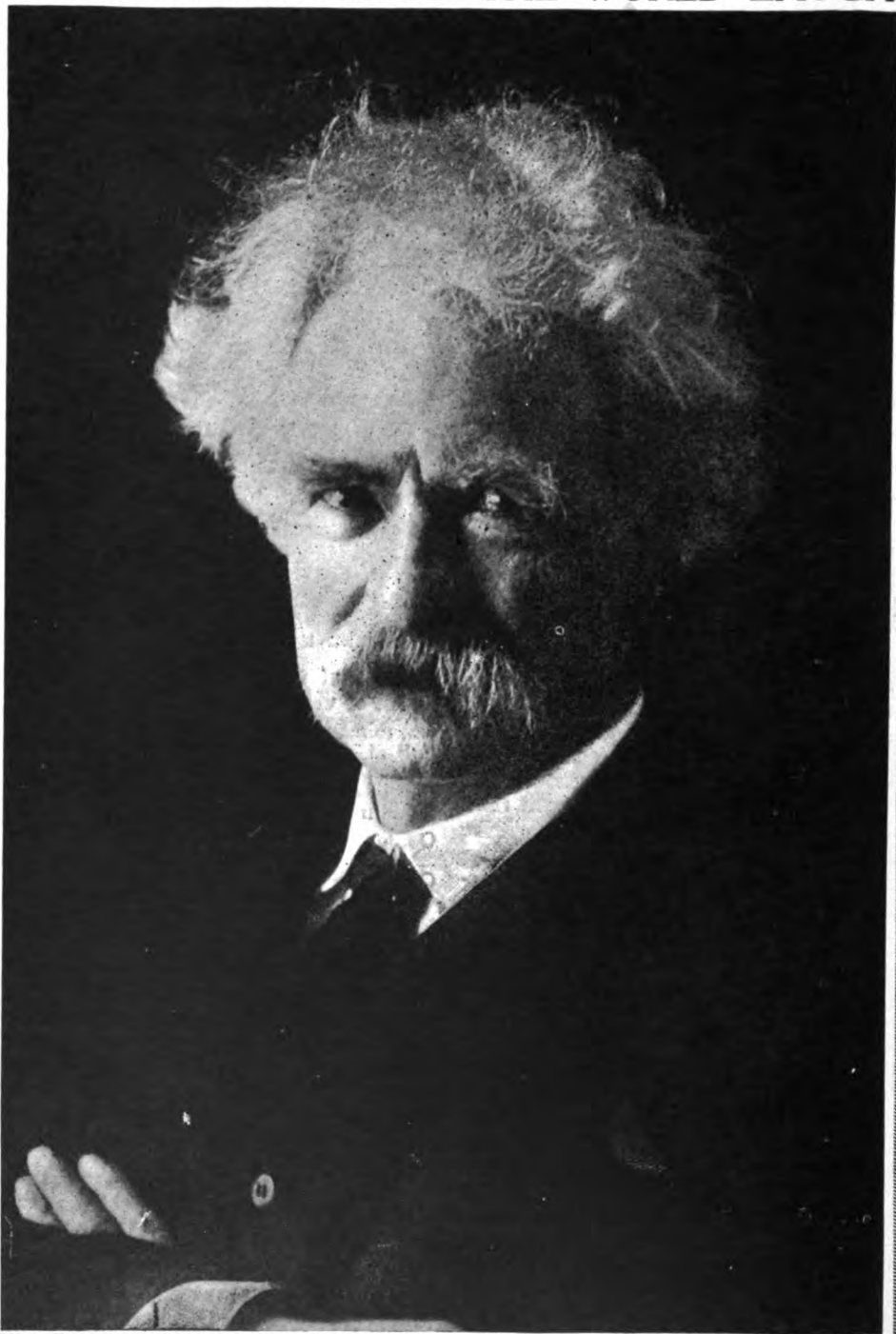
Oh, for the voices of animals—Oh, for the swiftness and balance of fishes !

Oh, for the dropping of raindrops in a song !

Oh, for the sunshine and motion of waves in a song !

When Whitman began writing like that, in 1855, there were very few people who considered he was anything of a poet. In poetry we are accustomed to look for carefully chosen words, regular metre, and very often harmonious rhyme. Yet none of these beauties make poetry ; they are like the work of the jeweller that turns a piece of rough gold into a pretty gem. The rough gold of poetry is thought, feeling, imagination. All these abound in the strange, uncouth lines of Walt Whitman, and no writer of modern times has better expressed in written words the thoughts and aspirations, the feelings and sympathies, of a freedom-loving, fearless son of Nature. His style is very vigorous. "Leaves of Grass," as he called his first collection of these strange and

THE MAN WHO MADE THE WORLD LAUGH



Mark Twain, whose real name was Samuel Langhorne Clemens, was probably America's most widely known literary man. Though he won his greatest fame as a humourist he had wonderful descriptive powers and he could write biting satire as well. No one has succeeded better in showing real boy nature than he has done in Tom Sawyer and Huckleberry Finn. Few men had more friends than he, and in spite of all his fame he remained simple and unaffected to the end of his life.

shapeless songs, full of real poetic power, was the forerunner of many books, and the most characteristic; but it is doubtful if critics will ever agree in their opinion of the writer, beyond admitting that Whitman was at least a great force in modern American thought, that in his individual voice we hear also the voice of America.

WHY WE SHOULD TAKE OFF OUR HATS TO WALT WHITMAN

Whitman's father was a worker with his hands—a carpenter and builder—and Walt, though early in life engaged as a school teacher, was also employed at one time as a printer and again as a carpenter. He wandered much throughout the wide lands of the West, edited newspapers, and made friends with all sorts of humble folk. One winter he drove a stage-coach for a time, in order to keep the place of a driver who was lying ill, and in this we have the real large-hearted man, who sings of his love of comrades in his strange songs. During the Civil War he volunteered as an army-nurse, and for some years he laboured like the giant he was, tending the sick and wounded, all of whom loved the great, gentle fellow that could minister to them with all the tenderness of a woman.

Abraham Lincoln said of him: "He looks like a man!" He was indeed a man, but even his splendid frame could not stand the strain put on it during the war, and when, in 1873, he became partly paralysed, that was the penalty he paid for his services to his fellow-men. In his later years, however, he enjoyed many serene days, and was not without honour even in his own country. Whatever we may think of him as a poet, we must take off our hats to the man, Walt Whitman.

BRET HARTE, WHO SOUGHT GOLD AND GAVE THE WORLD SOMETHING BETTER

The last of the great American writers with whom we are here concerned died not very long ago in England, where he had lived for many years. Francis Bret Harte had a varied and picturesque career, and many of his own experiences of the rough life in the pioneer days of California were used by him in his inimitable short stories and poems. He was born at Albany, New York, on August 25, 1839, his father being an eminent scholar, so that Francis

started out with a distinct bent towards the delights of reading and writing. He was only eleven when his first poem was printed in a New York newspaper, but this was only made fun of at home. His father died when Francis was still a youth, and at the age of seventeen he set out to seek his fortune in the goldfields of California. Like many another, he did not find gold for the seeking. He tried many occupations, and was also a soldier for a time, rising to the rank of colonel during the Civil War.

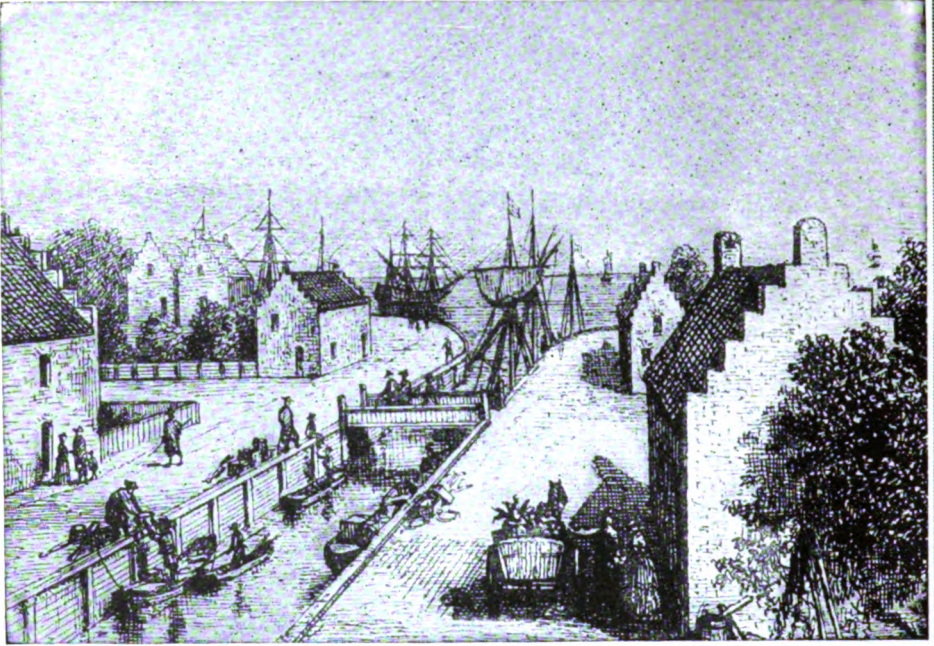
It was while engaged as a type-setter on a San Francisco newspaper in 1857 that Bret Harte began to write short sketches, some of which he himself set up in type. Nine years later he was the editor of a new magazine in San Francisco, and in it he published his famous story, "The Luck of Roaring Camp," which is certainly one of the finest short stories ever written. That and "The Heathen Chinee," a delightfully humorous poem, proved sufficient to make his name famous, and for the rest of his life he maintained a great reputation as a writer of tales. Bret Harte came to Glasgow as American Consul in 1880, and in 1885 settled in London, engaging solely in literary work until his death at Aldershot, on May 6, 1902.

HOW "MARK TWAIN," THE HUMORIST, GOT HIS NAME

Of his great American writers, the world-famous humorist, Mark Twain, author of the celebrated "Jumping Frog," "Innocents Abroad," and other entertaining fiction, is the contemporary of most of the poets and story-tellers whose lives we have been discussing, for he was born on November 30, 1835, and had a life resembling in some ways that of Bret Harte. His proper name was Samuel Langhorne Clemens.

The name which he has made familiar all the world over he adopted from the call of the Mississippi boatman who takes the sounding of the river to let the captain know the depth of water, and calls out, "Mark twain," meaning, "by the mark, two fathoms," when the line indicates that depth of water. Mr. Clemens was himself a Mississippi pilot, and among the many books he has written is one describing his life on that great river of the New World.

OLD NEW YORK AND NEW CALIFORNIA



This is a view of an old Dutch part of the City of New York which Washington Irving so loved. Canal Street, which you see here, was really a canal into which the small ships could go, though it was long ago covered over. Notice the queer Dutch houses, a few of which still remain in the city.



This is a modern picture of gold miners at work, but the miners are doing the same things which those described by Bret Harte did. This surface mining is called placer mining, and requires no capital and no great skill. In the days of which Bret Harte tells, thousands of men in California were doing these very things



THE GRANDMOTHER'S TALE

PIERRE JEAN DE BÉRANGER was the greatest song-writer of France. He was born in 1780 and died in 1857, so that he lived through the most exciting periods of French history. He had a very eventful life, but nothing prevented him from writing his charming songs, full of wit and pathos. Béranger is often compared to the Scottish poet Burns. He was a great admirer of Napoleon, whose praises he sounds in this beautiful poem, which many of us will think worthy of a nobler theme.

His fame shall never
pass away !
Beside the cottage
hearth the hind

No other theme shall list to find
For many and many a distant day.
When winter nights their gloom begin,
And winter embers ruddy glow,
Round some old gossip closing in,
They'll beg a tale of long ago—
"For all," they'll say, "he wrought us ill,
His glorious name shall ne'er grow dim,
The people love, yes, love him still,
So, grandmother, a tale of him,

A tale of him !"

"One day past here I saw him ride,
A caravan of kings behind ;
The time I well can call to mind,
I hadn't then been long a bride.
I gazed out from the open door,
Slowly his charger came this way ;
A little hat, I think; he wore,
Yes, and his riding coat was grey.
I shook all over as quite near,
Close to this very door he drew—
'Good-day,' he cried, 'good-day, my dear !'
"What, grandmother, he spoke to you,
He spoke to you ?"

"The following year I chanced to be
In Paris; every street was gay,
He'd gone to Notre Dame to pray,
And passed again quite close to me !
The sun shone out in all its pride,
With triumph every bosom swelled ;
'Ah, what a glorious scene !' they cried,
'Never has France the like beheld !'
A smile his features seemed to wear,
As on the crowds his glance he threw,
For he'd an heir, at last, an heir !"—
"Ah, grandmother, what times for you,
What times for you !"

CONTINUED FROM 1408



"Then came for France
that dreadful day
When foes swept over
all the land ;

Undaunted he alone made stand,
As tho' to keep the world at bay !
One winter's night, as this might be,
I heard a knocking at the door ;
I opened it ; great heavens ! 'twas he !
A couple in his wake—no more ;

Then sinking down upon a seat—
Ay, 'twas upon this very chair,
He gasped : 'Defeat ! Ah, God, defeat !'
"What, grandmother, he sat down there,
He sat down there ?"

"He called for food ; I quickly brought
The best I happened to have by ;
Then when his dripping clothes were dry,
He seemed to doze awhile, methought.
Seeing me weeping when he woke,
'Courage,' he cried, 'there's still a chance ;
I go to Paris, one bold stroke,
And Paris shall deliver France !'
He went ; the glass I'd seen him hold,
The glass to which his lips he'd set,
I've treasured since like gold, like gold !"
"What, grandmother, you have it yet,
You have it yet ?"

"'Tis there. But all, alas ! was o'er ;
He, whom the Pope himself had crown'd,
The mighty hero world-renown'd,
Died prisoner on a far-off shore.
For long we none believed the tale,
They said that he would reappear,
Across the seas again would sail,
To fill the universe with fear !
But when we found that he was dead,
When all the shameful truth we knew,
The bitter, bitter tears I shed !"

"Ah, grandmother, God comfort you,
God comfort you !"

THE LAST ROSE OF SUMMER

This little poem is by the sweet Irish singer, Thomas Moore, and is one that is widely known and much loved, and has been put to music.

'Tis the last rose of summer
Left blooming alone ;
All her lovely companions
Are faded and gone ;
No flower of her kindred,
No rose-bud is nigh,
To reflect back her blushes,
Or give sigh for sigh.

I'll not leave thee, thou lone one !
To pine on the stem ;
Since the lovely are sleeping,
Go, sleep thou with them.
Thus kindly I scatter
Thy leaves o'er the bed
Where thy mates of the garden
Lie scentless and dead.

So soon may I follow,
When friendships decay,
And from love's shining circle
The gems drop away.
When true hearts lie withered,
And fond ones are flown,
O ! who would inhabit
This bleak world alone ?

JUDGE not ; the workings of his brain
And of his heart thou canst not see ;
What looks to thy dull eyes a stain,
In God's pure light may only be
A scar brought from some well won field
Where thou wouldst only faint and yield.

THE COURTIN'

"The Courtin'," by James Russell Lowell, tells of a New England courtship in the language of countryside, and is full of a delicate humour and pathos.

GOD makes sech nights, all white an' still
Fur'z you can look or listen,
Moonshine an' snow on field an' hill,
All silence an' all glisten.

Zekle crep' up quite unbeknown
An' peeked in thru' the winder,
An' there sot Hukly all alone,
'Ith no one nigh to hender.

A fireplace filled the room's one side
With half of cord o' wood in—
There warn't no stoves (tell comfort died)
To bake ye to a puddin'.

The wa'nut logs shot sparkles out
Towards the pootiest, bless her,
An' leetle flames danced all about
The chiny on the dresser.

Agin the chimbley crook-necks hun;
An' in amongst 'em rusted
The old queen's-arm thet gran'ther Young
Fetched back from Concord busted.

The very room, coz she was in,
Seemed warm from floor to ceilin',
An' she looked full ez rosy agin
Ez the apples she was peelin'.

"Twas kin o' kingdom-come to look
On sech a blessed cretur,
A dogrose blushin' to a brook
Ain't modester nor sweeter.

He was six foot o' man, Ar,
Clear grit an' human natur' ;
None couldn't quicker pitch a ton
Nor dror a furrer straighter.

He'd sparked it with full twenty gals,
He'd squired 'em, danced 'em, druv 'em.
Fust this one, an' then thet, by spells—
All is, he couldn't love 'em.

But long 'o' her his veins 'ould run
All crinkly like curled maple,
The side she breshed felt full o' sun
Ez a south slope in Ap'il.

She thought no v'ice hed sech a swing
Ez hisn in the choir ;
My ! when he made Ole Hundred ring,
She *knowed* the Lord was nigher.

An' she'd blush scarlit, right in prayer,
When her new meetin'-bonnet
Felt somehow thru' its crown a pair
O' blue eyes sot upon it.

Thet night, I tell ye, she looked *some*.
She seemed to 've gut a new soul,
For she felt sartin-sure hed come,
Down to her very shoe-sole.

She heered a foot, an' knowed it tu,
A 'raspin' on the scraper—
All ways to once her feelin's flew
Like sparks in burnt-up paper.

He kin' o' l'itered on the mat,
Some doubtfle o' the sekle,
His heart kep' goin' pity-pat,
But hern went pity Zeckle.

An' yit she gin her cheer a jerk
Ez though she wished him funder,
An' on her apples kep' to work,
Pa-rin' away like murder.

"You want to see my pa, I s'pose ?"
"Wal—no—I come dasignin'"—
"To see my ma ? She's sprinklin' clo'es
Agin to-morrer's i'nin'."

To say why gals acts so or so,
Or don't, 'ould be presumin' ;
Mebby to mean *yes* an' say *no*
Comes nateral to women.

He stood a spell on one foot fust,
Then stood a spell on t'other,
An' on which one he felt the wust
He couldn't ha' told ye nuther.

Says he, "I'd better call agin"
Says she, "Think likely, mister."
Thet last word pricked him like a pin,
An'—wal, he up an' kist her.

When ma bimeby upon 'em slips,
Huldy sot pale ez ashes,
All kin' o' smily roun' the lips
An' teary roun' the lashes.

For she was jes' the quiet kind
Whose naturs never vary,
Like streams that keep a summer mind
Snowhid in Jenooary

The blood clost roun' her heart felt glued
Too tight for all expressin',
Tell mother see how matters stood,
An' gin 'em both her blessin'.

Then her red come back like the tide
Down to the Bay o' Fundy,
An' all I know is they was cried
In meetin' come nex' Sunday.

LITTLE SOPHY BY THE SEASIDE.

Charles Tennyson Turner, who wrote this charming sonnet, or poem of fourteen lines, was the elder brother of the great Lord Tennyson, and took the name of Turner when he inherited the fortune of a relative. He wrote many sonnets.

YOUNG Sophy leads a life without alloy
Of pain ; she dances in the stormy air ;
While her pink sash and length of golden hair
With answering motion time her step of joy.
Now turns she through that seaward gate of
heaven,

That opens on the sward above the cliff,—
Glancing a moment at each barque and skiff,
Along the roughening waters homeward driven.
Shoreward she hies, her wooden spade in hand,
Straight down to childhood's ancient field
of play,
To claim her right of common in the land
Where little edgeless tools make easy way—
A right no cruel Act shall e'er gainsay,
No greed dispute the freedom of the sand.

THE SUN

In the CHILD'S STORY OF THE EARTH we are told
all about the wonders of the big ball on which we live,
and how it is daylight in some places while it is dark in
others. In the following verses Thomas Miller expresses
this fact in simple words that can easily be remembered.

SOMEWHERE it is always light,
For when 'tis morning here,
In some far distant land 'tis night,
And the bright moon shines there.
When you're undressed and going to bed,
They are just rising there,
And morning on the hills doth spread
When it is evening here.
And other distant lands there be,
Where it is always night ;
For weeks and weeks they never see
The sun, nor have they light.
For it is dark both night and day,
But what's as wondrous quite,
The darkness it doth pass away,
And then for weeks 'tis light.
Yes, while you sleep the sun shines bright,
The sky is blue and clear ;
For weeks and weeks there is no night,
But always daylight there.

* BABYLAND

The poems about the imaginary land where the babies
live before they come to stay in the homes of ordinary
folk are endless in number and fancy. Miss Ella Wheeler
Wilcox, our American writer, describes a lovely and
bewitching Babyland in this poem. She is true to the old,
old story that the stork knows the way to Babyland, and
that it alone can bring away the tiny inhabitants of the
happy valley to the country cottage or the city mansion.

HAVE you heard of the Valley of Babyland ?
The realm where the dear little darlings
stay,

Till the kind storks go, as all men know,
And, oh, so tenderly bring them away ;
The paths are winding, and past all finding
By all save the storks, who understand
The gates and the highways, and the intricate
byways

That lead to Babyland.

All over the Valley of Babyland
Sweet flowers bloom in the soft green moss ;
And under the ferns fair, and under the plants
there,

Lie little heads like spools of floss.
With a soothing number the river of slumber
Flows o'er a bedway of silver sand ;
And angels are keeping watch o'er the sleeping
Babes of Babyland.

The path to the Valley of Babyland

Only the kingly, kind storks know ;
If they fly over mountains, or wade through
fountains,

No man sees them come or go.
But an angel may be, who guards some baby,
Or a fairy perhaps, with her magic wand,
Brings them straightway to the wonderful
gateway

That leads to Babyland.

And there in the Valley of Babyland,

Under the mosses and leaves and ferns,
Like an unfledged starling, they find the
darling

For whom the heart of a mother yearns ;
And they lift him lightly, and snug him
tightly

In feathers soft as a lady's hand ;
And off with a rockaway step they walk
away

Out of Babyland.

As they go from the Valley of Babyland

Forth into the world of great unrest,
Sometimes in weeping he wakes from sleeping,
Before he reaches the mother's breast.

Ah, how she blesses him, how she caresses
him !

Bonniest bird in the bright home band,
That o'er land and water the kind stork
brought her

From far-off Babyland.

THERE'S ROOM AT THE TOP

"There's Room at the Top" was written by Mrs. Lilla T.
Elder, an American poet. Mrs. Elder, who had children
of her own, so thoroughly understood child nature, that
her verses cannot fail to be a source of delight to boys and
girls of all ages. Several of her most charming poems
will be found in different parts of the Child's Book of
Poetry.

THE hill of success may be steep, boys,
And hard work it may be to climb,
But the way grows smooth towards the top, boys,
And it's only one step at a time !

Be sure you are honestly shod, boys !
Take the staff of Self-help in your hand,
Watch out for the rough, rocky tread, boys,
And trust not to gravel or sand.

Look not far up into the clouds, boys,
Nor yet on the valley below,
But steadfastly, patiently, climb, boys !
Each step of the way learn to know !

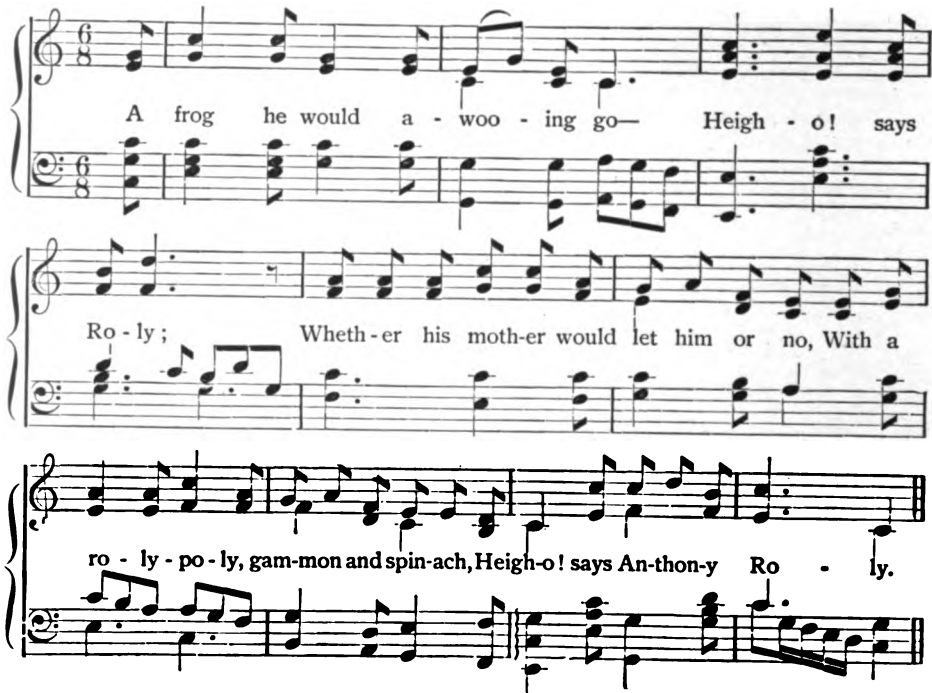
Respect well the right of road, boys,
Let others more swift pass you by,
And fail not to hold out a hand, boys,
To all those who stumble and sigh.

There's plenty of room at the top, boys,
Though crowded the pathway and long,
And no one need fail in the end, boys,
If he's honest and patient and strong.

LIVING for self and thinking of self,
And of nothing on earth beside,
Just as if Jesus had never lived,
And as if He had never died.

ANON.

A FROG HE WOULD A-WOOING GO



So off he set in his coat and hat,
 Heigho! says Roly.
 And on the way he met a rat,
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

"Please, Mr. Rat, will you go with me?"
 Heigho! says Roly.
 "Good Mrs. Mousie for to see?"
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

When they came to the door of Mousie's hole,
 Heigho! says Roly.
 They gave a loud knock, and they gave a
 loud call,
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

"Please, Mrs. Mouse, are you within?"
 Heigho! says Roly.
 "Oh, yes, dear sirs, I am sitting to spin,"
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

"Please, Mrs. Mouse, will you give us some
 beer?"
 Heigho! says Roly.
 "For Froggie and I are fond of good cheer,"
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

"Please, Mr. Frog, will you give us a song?"
 Heigho! says Roly.
 "But let it be something that's not very long,"
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

But while they were making a terrible din,
 Heigho! says Roly.
 The cat and her kittens came tumbling in,
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

The cat she seized Mr. Rat by the crown,
 Heigho! says Roly.
 The kittens they pulled Mrs. Mousie down,
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

This put Mr. Frog in a terrible fright
 Heigho! says Roly.
 He took up his hat and he wished them
 good-night,
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

But as Froggie was crossing over a brook,
 Heigho! says Roly.
 A lily-white duck came and swallowed
 him up,
 With a roly-poly, gammon and spinach,
 Heigho! says Anthony Roly.

THE TALES OF SIR WALTER SCOTT

THERE does not exist in English literature any series of books by one man that can compare in quantity or in quality with the *Waverley Novels*, written by Sir Walter Scott between the years 1814 and 1831. These wonderful tales of the past would fill no fewer than 10,000 closely-printed pages, and the period of history covered by them is more than 700 years. Clearly, then, it is impossible to re-tell here all the stories in the *Waverley Novels*. A complete edition usually contains twenty-five volumes, and there are in all thirty-two stories. A number of the novels that can best be re-told in a little space will be dealt with in these pages; but, in addition to that, we must have some general idea of the whole series, and so we may begin by looking at the whole of this wonderful library before we turn to the particular books.

THE WAVERLEY NOVELS

ALTHOUGH Sir Walter Scott's novels cover a period of more than 700 years of European history, we are not to suppose that he wrote them in the order of time. As a matter of fact, the very first of his stories described the life of only sixty years before his own day. It was called "*Waverley*;" or "*Tis Sixty Years Since*," and dealt with the Jacobite rising of 1745. The story that goes furthest back into history was one of the last two he wrote in the year 1831. It is called "*Count Robert of Paris*," and deals with the First Crusade of the eleventh century, the scene being laid chiefly in and around the wonderful city of Constantinople.

We must always bear in mind when we are thinking about the *Waverley Novels* that, though most of them are founded upon fact, they do not derive their chief interest from being historical, but from being told with so much spirit and romantic force that we are enthralled by the swift and straightforward movement of the story, and never stop to ask ourselves whether it is all true history or largely the invention of the wizard story-teller.

Perhaps it will be best, though it is certainly unusual, to take our quick glance through the *Waverley Novels*, not in the order in which the author wrote them, nor yet in the order we ourselves need read them, but in their historical order, as though



they were all chapters in one long tale of seven hundred years.

"*Count Robert of Paris*," as we have already heard, is a tale of the First Crusade, of the year 1098. The story itself, or rather what is called the "plot," is not very remarkable, but the adventures of the count and the other leaders of the Crusade, among whom was the famous Peter the Hermit, are full of healthy excitement, and give us a fine picture of those distant times when men lived only to fight, most of the Crusaders even being more anxious for the fighting than for the avowed object of the Crusade, which was the delivering of the supposed sepulchre of Christ from the hands of the Mohammedans.

The next novel in point of time is "*The Betrothed*," the scene of which is laid chiefly in Wales about the year 1187. This was the time of the Third Crusade, and, indeed, the novel was written as one of the "*Tales of the Crusaders*." Its interest, however, centres in Wales, the heroine being Eveline, the daughter of Sir Raymond, a Norman lord. She is "the betrothed," for she undertakes to wait three long years to become the wife of Sir Hugo de Lacy, who has gone away to fight with the Crusaders. But before he can return Eveline is captured by a Welsh prince, who had previously sought to marry her, but had been defeated by Sir Hugo when attacking Sir Raymond's castle. Sir

Hugo's nephew, Sir Damian, rescues her, and is almost killed himself. Eveline nurses him, and they fall in love with each other. When Sir Hugo returns from the Crusade and finds that his nephew loves his own "betrothed," he generously stands aside and allows them to marry.

HEROES AND HEROINES OF "THE TALISMAN" AND "IVANHOE"

"The Talisman," which is one of the finest of Sir Walter's stories, deals with the same period of history and the battles of the Crusaders in Assyria during the year 1191. The great hero of the story is Richard I., or Richard the Lion-Heart, and his noble enemy is the Sultan Saladin. The "talisman" is just a little red purse which Saladin carries in his bosom, and which, when he comes disguised as a physician into the camp of the English king, he uses to cure Richard of a fever. There is, of course, a love story in the book as well, and endless adventures. The heroine, the Lady Edith, a kinswoman of Richard, marries Sir Kenneth, the heir to the Scottish throne, and Saladin presents her with his "talisman."

"Ivanhoe" is a splendid romance of life in England, just three years later than the period of the previous novel. This is one of the books we shall read further on.

Next comes "Castle Dangerous," which is a romance of "The Perilous Castle of Douglas," so called because it was three times taken from the English in the years 1306 and 1307. This story was the last which the great novelist wrote, when he was broken in health and fortune and had not many more months to live.

THE STORIES OF "THE FAIR MAID OF PERTH" AND "THE BLACK MONK"

But "The Fair Maid of Perth" takes us nearly another century onward in history, as the period is 1402, though a descendant of the Douglas has an important part to play in the story. Henry IV. now rules in England, and Robert III. in Scotland. There are two love stories in the book, but the one that interests us most is, of course, that of the "Fair Maid," whose name is Catharine Glover.

On St. Valentine's Day Catharine kisses Henry Smith, the armourer, while he is asleep, and afterwards he proposes to marry her, but she refuses. In the end,

however, and after many adventures, when Henry might have a knighthood if he cared to accept it, the "Fair Maid" becomes the wife of the armourer.

These were the days when many Scotsmen went abroad to fight for foreign kings and princes in the wars which were always raging on the Continent. "Quentin Durward," which is one of the best of the novels, is the tale of a young Scotsman of that name who finds his fortune as one of the Scottish guards of Louis XI. of France, and ends by marrying a countess in the year 1468.

Just six years later is the period described in "Anne of Geierstein," in the scenes of which we travel to Switzerland, Germany, and France, and learn much about the secret Tribunal of Westphalia, presided over by the "Black Monk," the father of Anne. Two English gentlemen, the Earl of Oxford and his son, Sir Arthur de Vere, are travelling, disguised as merchants, bearing a letter to the Duke of Burgundy, and it would have gone ill with them had it not happened that Anne had met Sir Arthur and fallen in love with him before. So her father acquitted them, and later on Sir Arthur married Anne.

THREE STORIES OF THE DAYS OF THE GREAT REFORMATION

We are at home in Melrose, on the Tweed, and the neighbourhood which Sir Walter loved so much, in the story of "The Monastery," and the year is 1550. "The Abbot" is also a story of Scotland in the year 1557, and both of these are largely concerned with the Reformation, neither being so interesting as most of the other novels, though Mary Queen of Scots is splendidly described in "The Abbot." "Kenilworth" is a third story of Reformation times, the period being 1575, and it is infinitely more interesting than either of the other two. Nothing could be finer than its animated descriptions of Kenilworth Castle and the fête given there by the Earl of Leicester in honour of Queen Elizabeth, whose character is finely described. Leicester has secretly married Amy, the daughter of Sir Hugh Robsart, but cannot let this be known to the queen. Amy's end is mysterious. The story is full of exciting incidents and characters so well described that we seem to have seen them in real life, and are never likely to forget them.

We arrive at the beginning of the seventeenth century, during the reign of King James I., in "The Fortunes of Nigel," which tells the extraordinary adventures of a young Scottish nobleman who comes to London to get the king to restore his estates, and how he succeeds, after many disappointments, in establishing his "fortunes," while in "A Legend of Montrose" we have passed over forty years, and find ourselves in Scotland during that terrible time when the Civil War was raging in England and the Earl of Montrose was fighting for King Charles in the North against the Covenanters, who were led by the Marquis of Argyll. This story contains one of the novelist's finest characters, in the person of Sir Dugald Dalgetty.

IN THE DAYS OF THE "MERRY MONARCH" AND THE GAY CAVALIER

King Charles I. is beheaded, and the Commonwealth has been declared by the year 1652, with which "Woodstock" deals. Though not one of Sir Walter's best works, this is a spirited and entertaining romance, which is chiefly concerned with the adventures of Charles II., ending with the death of Cromwell and the king's entry into London. "Peveril of the Peak" carries us some twenty years later and well into the reign of "the merry monarch," the period being 1678. It is a story of Cavalier and Roundhead, the daughter of one who had been a supporter of the Commonwealth, Major Bridgenorth, falling in love with Julian Peveril, a Cavalier. It is a very long story, and contains the enormous number of 108 characters. The hero and heroine marry in the end, of course. "The Peak" is another name for Derbyshire, in which many of the incidents happen.

THE MOST TRAGIC OF ALL SIR WALTER SCOTT'S STORIES

The time of "Old Mortality" is exactly the same as the previous story, but the scene has changed to Scotland and Holland. Of this we shall read at greater length. "The Bride of Lammermoor," perhaps the greatest, and certainly the most tragic, of all the Waverley Novels, comes next in point of time. It tells of the sad fate that

befell Lucy Ashton, because she yielded to the pressure of her parents and married Hayston of Bucklaw, while her true lover, the last Lord of Ravenswood, was hastening home to her from the wars in the Netherlands.

"The Pirate" gives us a truly romantic picture of the wild scenery and the primitive life of the Shetland Islands at the beginning of the eighteenth century; while "The Black Dwarf" is a romance of about the same period, the scene being laid in the Lowlands of Scotland. "The Black Dwarf" is a mysterious person who is consulted by Isabella Vere, the daughter of a Jacobite leader, who would force her to marry his friend, Sir Frederick Langley. The Black Dwarf helps her, for he is really Sir Edward Mauley, and has power over the unscrupulous Sir Frederick. He appears just as the wedding is about to take place, and forbids it. Isabella later marries her own true love, the young squire Earnscliff.

STIRRING STORIES OF THE WILD, SCOTTISH HIGHLANDS

"Rob Roy," that splendid story of a Highland chief, brings us to the year 1715, and, of course, we must read of it further on as well as of "The Heart of Midlothian" and "Waverley," both of which also refer to the first half of the eighteenth century. Next comes "Redgauntlet," the story of a conspiracy formed by Sir Edward Hugh Redgauntlet in the year 1763 on behalf of the Young Pretender. "Guy Mannering," which introduces us to many memorable characters, though the hero himself is not one of these, brings us to the second half of the eighteenth century, with which period the story of "The Surgeon's Daughter" is also concerned. This describes the remarkable adventures of Menie Gray in India, and her return to her native country.

We are just at the closing years of the eighteenth century in the stirring romance of "The Antiquary," which we shall deal with at greater length, and last of all there is "St. Ronan's Well," which brings us into the earlier years of the nineteenth century. This is not a very successful work compared with some of the other fine stories among the long list of the Waverley Novels.

THE STORY OF A HIGHLAND REBELLION

BEING THE ROMANCE OF "WAVERLEY"

THE Second Jacobite Rebellion was almost confined to the Scottish Highlands, and broke out on the landing on Scottish soil of Charles Edward Stuart, grandson of James II. of England, called by his adherents "the Young Chevalier," and also "Bonnie Prince Charlie," and by the other party "the Young Pretender." It was the object of the rising to place this young man on the English throne, which was then occupied by George II.

THE YOUNG DAYS OF THE HERO, EDWARD WAVERLEY

Edward Waverley, the hero of Scott's first novel, was the son of Richard Waverley, an ambitious politician who looked to the Whigs, the supporters of the king, for political advancement, and nephew of Sir Everard Waverley, of Waverley-Honour, a wealthy bachelor who regarded Edward as his heir.

Sir Everard had no particular love for the House of Hanover, to which King George belonged, so that as Edward lived partly with his father, and partly with his uncle—his mother being dead—he came in his early years under the influences of the two great opposing political forces of the time.

Sir Everard and his sister, Mistress Rachel, became somewhat alarmed at their nephew's habits of desultory reading and love of solitude, which his father did nothing to counteract. Mistress Rachel suggested that the boy should travel on the Continent with his tutor.

YOUNG CAPTAIN WAVERLEY'S FATEFUL MISSION TO THE HIGHLANDS

Richard Waverley saw no objection to this plan. But Richard's political friends thought otherwise, and the result was that the lad was offered, and accepted, a captaincy in a dragoon regiment, then quartered at Dundee, whither he set forth, carrying, among other things, a fateful letter of introduction from his uncle to the Baron of Bradwardine at his Perthshire seat of Tully-Veolan, on the borders of the Highlands. The baron was an old friend of Sir Everard's, and had borne arms on behalf of the Stuarts.

After being initiated into his military duties at Dundee, young Waverley

gained leave of absence for a few weeks. He desired to see the country, but his first object was to visit his uncle's friend at Tully-Veolan, a typical old Scottish manor house. Here he received a cordial welcome from the baron and his daughter Rose, a sweet girl of about Waverley's own age. Her hair was of pale gold; her skin like the snow of her own mountains in whiteness. "Yet she had not a pallid or pensive cast of countenance; her features, as well as her temper, had a lively expression; her complexion, though not florid, was so pure as to seem transparent, and the slightest emotion sent her whole blood at once to her face and neck. Her form, though under the common size, was remarkably elegant, and her motions were light, easy, and unem'arrassed."

It fell to the lot of Rose Bradwardine to perform the duties of hostess and guide combined. Thus the two were constantly in one another's company.

THE ENGLISH GENTLEMAN AND THE HIGHLAND LASS

She rode with him in the vicinity of Tully-Veolan, and listened with delight as he talked of the books he knew and loved. But while those who saw them together so frequently bethought them that the baron was arranging a match between his daughter and the wealthy young Englishman, Rose's father shut his eyes to possibilities in this direction.

If he had thought of an alliance, Edward's indifference would have offered a bar to the project. His mind was still full of the influence of the old romances he had read in the library at Waverley-Honour. His imagination still led him into mental adventures in which female forms of exquisite grace and beauty mingled. Rose Bradwardine, beautiful and amiable though she was, had not precisely the sort of merit or beauty which captivates a romantic imagination in early youth. She was too frank, too confiding, too kind.

"Was it possible to bow, to tremble, and to adore before the timid yet playful little girl, who now asked Edward to mend her pen, now to construe a stanza in Tasso, and now to spell a very, very long word in his version of it?" No;

but, for all that, time at Tully-Veolan passed so agreeably that Waverley applied for and obtained an extension of his leave of absence. The permission was accompanied by a hint from his commanding officer, Colonel Gardiner, to the effect that he should not spend too much of his leisure in the company of those who, estimable as they might be in a general sense, were not supposed to be friendly to the Government or the king, to whose service he had been sworn.

About this time it happened that Tully-Veolan was raided by one Donald Bean Lean, a Highland cateran, or robber, who carried off the baron's milch cows. Raids of this kind were of frequent occurrence on the Highland border, and a local chieftain, Fergus MacIvor, Vich Ian Vohr, received from many Lowland gentlemen what was known as "protection money," as a surety against the attention of these robbers. Between this chieftain and the baron there had been a quarrel. Rose's father suddenly discovered that he had unknowingly, through an agent, paid "protection money" to Vich Ian Vohr. Thereupon he had promptly stopped the payment.

HOW WAVERLEY CAME TO THE HAUNT OF THE HIGHLAND ROBBER

But after Donald Bean Lean's escapade, Vich Ian Vohr, who held the baron in great respect, sent to the master of Tully-Veolan, offering aid in the recovery of the missing cattle. This message was brought to Tully-Veolan by a kinsman of the chief's, Evan Dhu MacCombich. From the last-named, Waverley heard accounts of Highland ways and customs that stirred his love of adventure. When, therefore, Evan Dhu offered to conduct him to the stronghold of Donald Bean Lean and the home of Vich Ian Vohr, he decided to accept the invitation.

Waverley's journey in the company of Evan Dhu, and the latter's wild-looking companions, through wild mountain scenery, was one well calculated to appeal to his love of the romantic, particularly that part of it which took him at night-time in silence over the waters of an unknown lake to the robber's fastness.

On meeting Donald Bean Lean, Waverley was astonished, even alarmed, to find a person of this description so accurately informed of the strength and

composition of the various garrisons and regiments quartered north of the Tay. His feelings were further played upon by the robber's mysterious language. Donald Bean Lean spoke as if Waverley had a secret message for him, and regarded it as a grievance that he was not thought worthy of confidence equally with the Baron of Bradwardine and Vich Ian Vohr.

AMONG THE FOLLOWERS OF "BONNIE PRINCE CHARLIE"

The meaning of all this Waverley was not to learn until later. Meanwhile he was hospitably entertained, and the only disconcerting incident was the disappearance of his seal. This was taken from him while he slept, and the outlaw used it as a sign of his authority to the recruits Waverley had taken with him to Dundee from Waverley-Honour, whom Donald Bean Lean urged to desert and to join the forces of Charles Edward, "Bonnie Prince Charlie," whenever they heard of the landing of this personage in Scotland.

After his visit to the secret hold of Donald Bean Lean, Waverley was escorted to Glennaquoich, the home of Vich Ian Vohr. He was received very cordially by this chieftain and his sister Flora. Flora MacIvor bore a striking resemblance to her brother. She had the same antique and regular correctness of profile, the same dark eyes, eyelashes and eyebrows, the same clearness of complexion. But the haughty and somewhat stern regularity of Fergus's features was beautifully softened in those of Flora. Her voice was soft and sweet, yet in urging any favourite topic it possessed the tones which impress awe and conviction.

THE CHARMING HEROINE WHO STOOD FAST FOR THE JACOBITES

Flora MacIvor was most devotedly attached to the exiled Stuarts. To contribute to the restoration of their family to the throne, "she was prepared to do all, to suffer all, to sacrifice all." And Flora was as accomplished as she was beautiful.

At first there was nothing at Glennaquoich to tempt Waverley to take up the cause which Vich Ian Vohr and his sister had at heart; that is to say, he was not directly asked to throw in his lot with the cause. But one day he took part in a hunting expedition. This was

organised as a kind of prelude to definite action by the Jacobites. Waverley met with an accident which delayed his return to Dundee. But Donald Bean Lean had gone there, and while Waverley was at Glennaquoich, the Jacobite was tempting the men of his regiment to join him, and intercepting letters sent to Waverley by Colonel Gardiner, first of all advising, and then commanding, his return to duty.

HOW AN ENGLISH SOLDIER JOINED THE SCOTTISH REBELS

At last despatches reached Waverley. They contained matters of very deep interest. His father wrote complaining bitterly of bad treatment at the hands of the Government. There was a long-delayed letter from Colonel Gardiner commanding his return to Dundee within three days. Then his uncle and aunt wrote asking him to resign his commission rather than render himself subject to such treatment as that which had been meted out to his father. From a newspaper put into his hands by Vich Ian Vohr, Waverley next learned that he had been deprived of his commission.

Regarding himself now as a man greatly wronged, one who had been publicly disgraced without a hearing, Waverley threw in his lot with the Highlanders. By this time Vich Ian Vohr had observed, with no little satisfaction, the growing attachment of Waverley to Flora. He saw, indeed, no bar to their union save the relations between Waverley's father and the Government, and his guest's commission in the king's army. These obstacles were now removed.

WAVERLEY MEETS THE PRETENDER TO THE BRITISH THRONE

On her part, if she entertained any feeling other than friendship for Waverley, Flora MacIvor did not show it. And, strongly attached as she was to the cause of the Stuarts, she appreciated the risk involved by the rebels, and bade Waverley consult his reason—not his resentment nor his feelings in regard to herself—before he decided to join them. But the resentment, or the feelings, or both, gained the day.

Thus, it happened that Waverley was introduced by Vich Ian Vohr to the Young Chevalier. And the personal charm of this unfortunate young man completed his conversion. Meanwhile,

Flora used her influence to make Waverley think more intimately of her friend, Rose Bradwardine, ignorant of her own brother's attachment to the baron's daughter. Between love and war, Waverley was carried almost breathlessly along in the train of the rebellion. He took part in the victory of the Highlanders at Preston-Pans, and in this battle saved the life of his uncle's friend, Colonel Talbot.

There was another incident of the battle which made a grave impression on Waverley's mind. This was the death of Colonel Gardiner. The colonel, sorely wounded, was maintaining a desperate and unavailing resistance against a strong body of the Highlanders when Waverley saw him.

THE DEATH OF WAVERLEY'S COLONEL ON THE FIELD OF PRESTON-PANS

"To save this good and brave man became the instant object of his most anxious exertions. But he could only witness his fall. Ere Edward could make his way among the Highlanders, who, furious and eager for spoil, now thronged upon each other, he saw his former commander brought from his horse by the blow of a scythe, and beheld him receive, while on the ground, more wounds than would have let out twenty lives."

After the battle of Preston-Pans Waverley marched with the rebels into England. He was with them in their enforced return, till the disaster at Clifton, where Vich Ian Vohr was taken prisoner. Then he was separated from them. Unflinchingly loyal to the cause he had espoused, Vich Ian Vohr met his death within the grim walls of Carlisle Castle. Broken at last in spirit, Flora MacIvor, lamenting that she had urged her brother on to his terrible end, sought refuge in the convent of the Scottish Benedictine nuns in Paris. Waverley was pardoned and his life was saved largely through the affectionate devotion of Rose Bradwardine, whose kindness to the outlaw's daughter was the means of bringing to light Donald Bean Lean's treacherous use of Waverley's letters and signet.

A wiser and an infinitely stronger man for his adventures, Waverley married Rose Bradwardine, and became master of Waverley-Honour.

The next stories of Famous Books begin on page 1599.

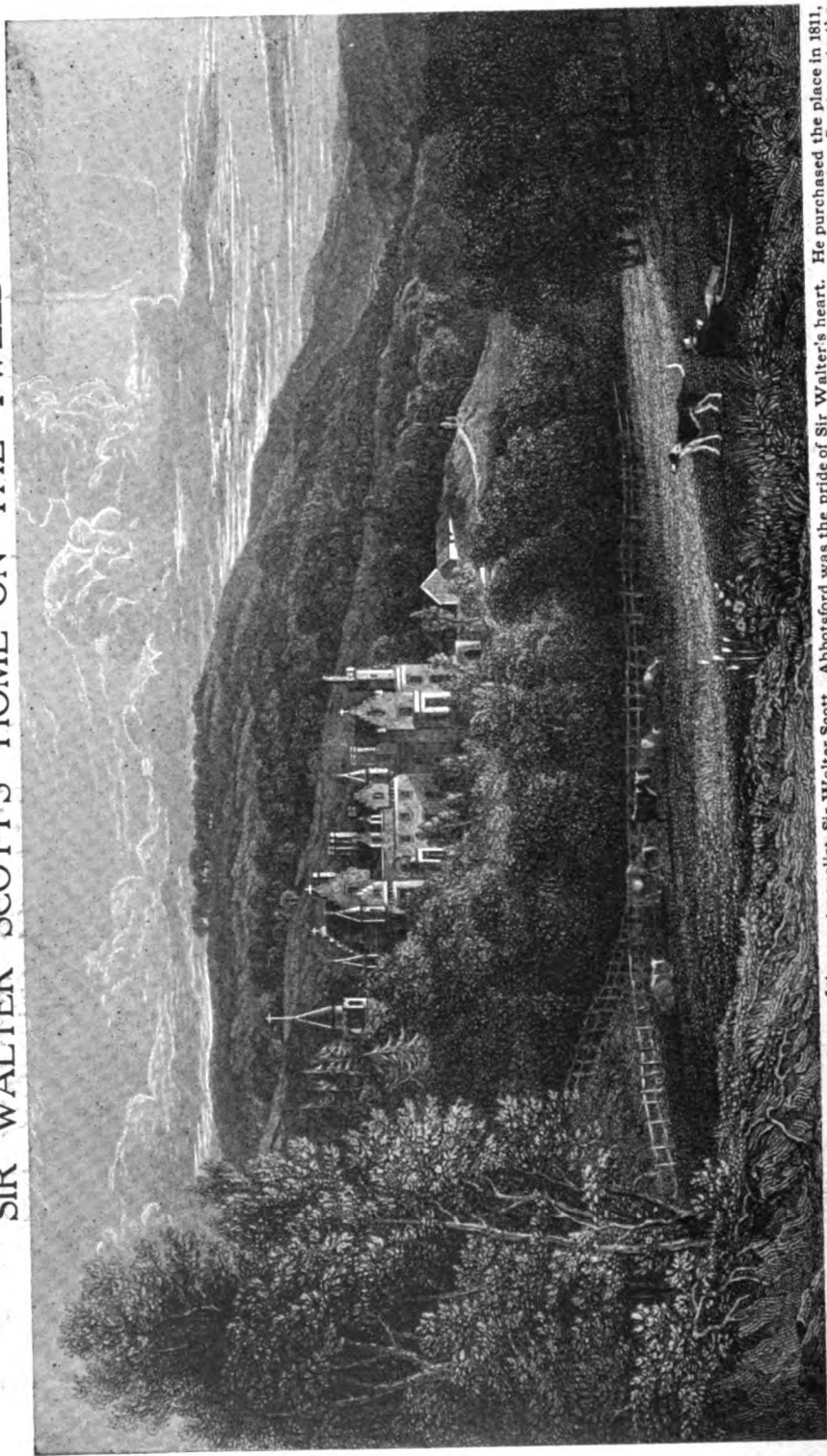
"PRINCE CHARLIE" THE YOUNG PRETENDER



Charles Edward Stuart, the grandson of James II. of England, was familiarly known to his followers as "Bonnie Prince Charlie," while his enemies called him "the Young Pretender." His father before him had attempted to regain the British throne, from which his grandfather had been driven, and the young man himself, in the year 1745, went over from his refuge in France to place himself at the head of his faithful followers in Scotland and to descend upon England in a final effort for his lost throne. Edward Waverley was an English officer who joined the cause, the unhappy story of which is told in Sir Walter Scott's great romance of "Waverley." This fine painting of Bonnie Prince Charlie and two of his followers is the work of John Pettie, R.A.

Photographed by Caswall Smith

SIR WALTER SCOTT'S HOME ON THE TWEED



Here is a picture of Abbotsford, the picturesque home of the great novelist, Sir Walter Scott. Abbotsford was the pride of Sir Walter's heart. He purchased the place in 1811, and on it he built his home, adding to it from time to time, until it became the imposing gabled mansion we see in the picture. It was at Abbotsford that Scott wrote the *Waverley* novels, and it was here that he died.



HOW TO MAKE PERFUME FROM FLOWERS

WE all know that scent is made from flowers, and we have often wanted to try to produce some

for ourselves. Perhaps we have shaken a few petals up in a bottle with some water, and then have been disappointed that the liquid did not possess the same fragrance as the perfume which we put on our handkerchiefs. Our failure was simply due to the fact that we did not set about the matter in the right way, and if we follow a process which is much after the lines on which the real scent-producers work, we shall meet with more success.

In the first place, it is necessary that we should gather the petals of roses, violets, or other blooms soon after they are open, and when they are quite dry. In order to make certain that there is no moisture on the blooms, it is a good plan to spread them out on a tray for a few minutes. While they are drying we may start the next stage in the process of the perfume making. We shall need some of the best Lucca oil for this purpose, and it is well to use that which is sold for table purposes, as the commoner sorts are not so pure.

Now get a sheet of wadding, and out of this cut some pieces of the material which shall be of a size to slip into a three-pound glass jam-jar. It is easy to round them off with a pair of scissors so that they fit into the jar quite easily.

The next step is to get a good-sized pie-dish, and into the bottom of this put some of the pieces of wadding, and then pour on a quantity of the oil. See that the bits of cotton-wool become thoroughly soaked with the oil, and when you have got ready about eight or a dozen pieces in this way, it is time to fetch the petals which we left on the tray. Now get your jam-jar and be sure that this is quite clean, and at the same time ask cook to let you have a small handful of salt. When you have all the things around you, you may start the next stage in the making of the scent. First of all sprinkle a thin layer of salt on the bottom of the jar, then cover this over with petals, and on the top of the petals place one of your pieces of wadding which has been soaked in oil. Then put

CONTINUED FROM 1354

some more salt, another layer of petals, and one more piece of wadding, and so on until the jar

is quite full. It is now necessary to make sure that the jar is perfectly air-tight, and the best way to bring this about is to tie a cover of grease-proof paper very tightly round the opening. Perhaps it will be as well to put the paper in two thicknesses, so as to be quite certain that no air can come in.

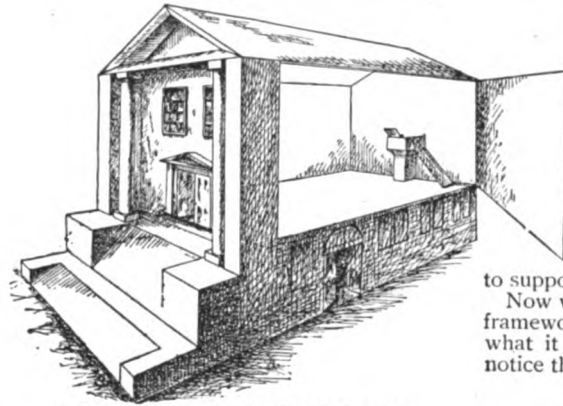
At this point the jar should be removed to a warm place, if possible where it will get plenty of sunshine. Remember that the more the sun shines on the petals the more likely will you be to get the best of the fragrance from the flowers.

The jar of petals must now be left as it is for at least a fortnight. At the end of fourteen days the cover may be taken off the jar containing the flowers. The thing to do next is to press the oil from the layers of wadding, and this will be found to smell like the best scent, according to the kind of flowers which have been treated. If roses have been used, the perfume will smell of these flowers, and so on. It is rather difficult to get all the oil out of the contents of the jar, and the easiest way is to use a big spoon, putting this inside and then pressing the layers as hard as we can. If, after doing this, we tip the jar up, the oil will trickle down into a bottle or anything we may have underneath. It will be found that this scent will keep almost for any time if kept in a well-stoppered bottle. A few drops placed on a handkerchief will give a splendid fragrance that will last a good deal longer than many of the cheap scents which are purchased.

After we have learned how to make the simple scents by the use of one kind of flower, it is interesting to try to prepare some combination perfume. As a matter of fact, nearly all the shop scents are produced by blending several scents together. A very pleasant perfume may be obtained, if when treating the rose leaves we scatter a few lavender blossoms on each layer; whilst in the same way rosemary leaves and violets will give us quite a fresh scent.

MAKING THE CHAPEL FOR MODELTOWN

MODELTOWN CHAPEL is a much plainer edifice than Modeltown Church, yet it will give us good scope for neat and careful work. Our chapel is in two floors, the upper floor being the chapel proper, and the lower or basement floor being a hall to be used for lectures, Sunday-school, and many week-day meetings. Then we shall provide a small store-room at the back, where we shall sup-

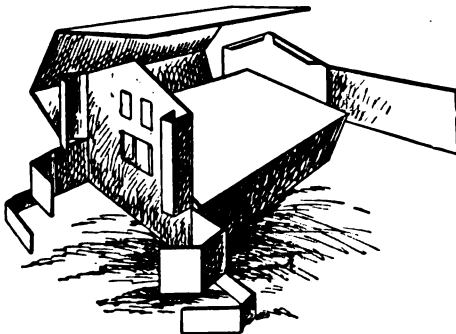


1. The chapel design, showing the interior

pose the heating furnace to be placed that will heat the water to circulate through the pipes in the chapel and the hall.

Picture 1 is a view of the chapel from the side, but it shows the front with its steps, pillars, and entrance-door; and the side is shown open, revealing the pulpit with its stair and reading-desk. Picture 2 represents the opposite side, and shows the store-room in the rear.

The main plan of the chapel is given in pictures 4 and 5. We draw both of these on card, remembering the meaning of the three kinds of lines as explained on page 446. The pictures are one-third scale, so that we must make our drawings on the card by using scale-rule C to take the measurements from the picture, and the full-sized rule to make our lines on the card. Having cut out both pieces, we glue them together at the places marked A and B on each, the folding slip on the smaller piece being attached by glue to



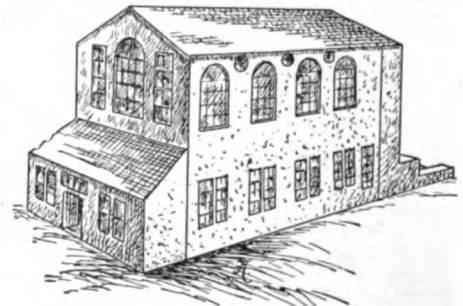
3. Folding up the walls

the edge of the floor of the larger piece. We must be careful when cutting the dotted lines half through, because in many of them the half-cuts are made not upon the side of the card upon which the drawing has been made, but upon the opposite side, so that the bending may be done in the opposite direction. The lines which have to be half cut on the back of the card are those in the front portion

of the building, and they are marked with a tiny circle at each end, so that we may recognise them. Having cut out the card, and before we bend it up, we glue inside the walls, at the place marked floor-line, small slips of wood. Large wooden matches, from which the heads have been cut off, will do nicely. We shall glue two to the side wall to which the roof is attached, and one to each end wall.

The purpose of these wood slips is to support the floor, as we shall see.

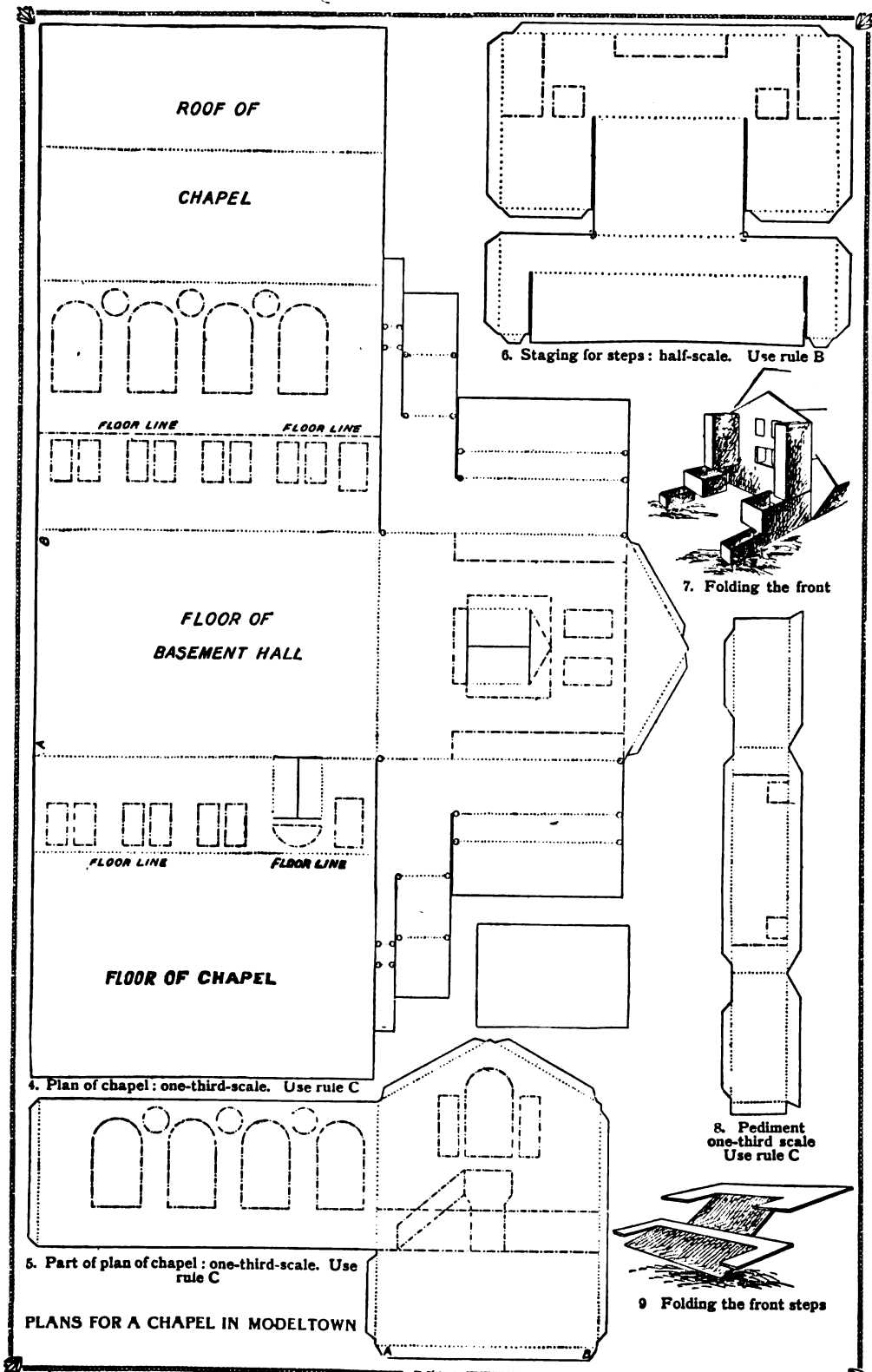
Now we can fold up the card to form the framework of the chapel. Picture 3 shows what it will be like as we do so. We must notice that the part marked floor in the plan

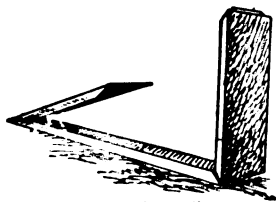


2. Chapel showing back

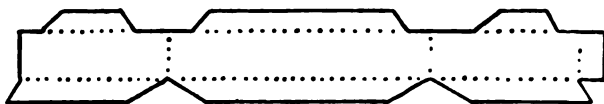
folds right into the building and rests upon the wood splinters that we have glued to the far side and to the ends. We glue the ends to the roof, leaving the full side wall to open and shut, as seen in picture 1. We must give particular attention to the front, bending the wings round as shown in picture 7. A touch of glue on the ends of the wings, where they touch the front of the chapel, will give them sufficient adhesion until the steps are put in. We must be careful to have the folded wings with their sides quite parallel.

The staging to make the steps is given in plan in picture 6, which is half-scale, so that we use scale-rule B to take our measurements from the picture, and the full-sized rule on our card. The dotted line marked with a circle at each end is to be half cut on the back of the card to enable it to be bent in the opposite direction. Having cut and folded this part into the form shown in picture 9, we fit it into the front of the chapel, and its position and appearance, when fitted so, is shown in picture 1. As there is no floor in this part of the building, it is easy to fix the steps properly, as we can work at it from below.

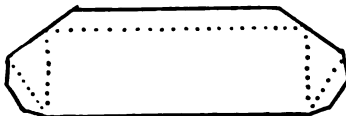




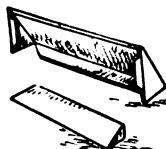
10. Folding the pediment



11. Plan of smaller pediment : actual size



12. Doorstep : actual size



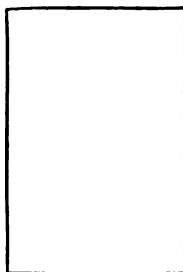
13. Doorstep folded



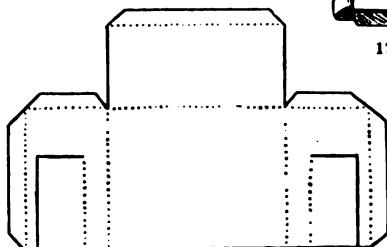
15. Bending a pillar end



14. Pillar ends : actual size



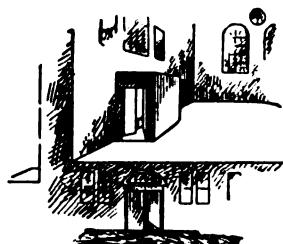
16. Plan of pillar : half-scale. Use rule B



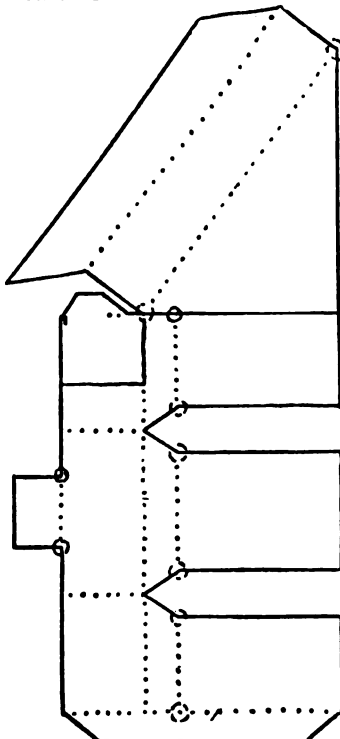
18. Plan of lobby : half-scale. Use rule B



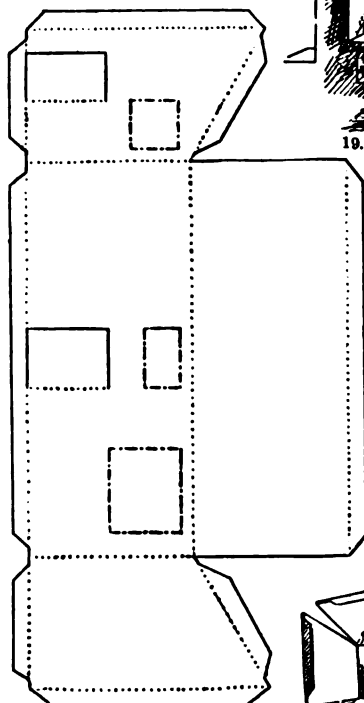
17. Shaping a pillar round a pencil



19. Position of lobby



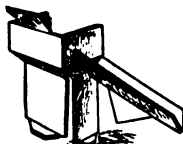
21. Plan of pulpit : actual size



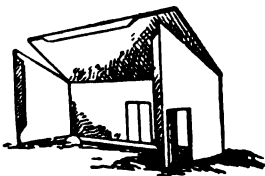
23. Plan of store-room : half-scale Use rule B



20. Bending the lobby



22. Bending the pulpit



24. Bending the store-room

In picture 1 we see at the top of the front of the chapel a triangular piece. This is called in architectural language a pediment. We shall now make and fix this piece. Its plan is shown, one-third scale, in picture 8, so that in drawing it we use scale-rule C to take the measurements from the picture. As it is being folded up, after having been cut out, the pediment will be like picture 10. Now we place it in position and glue it above the square side pillars of the front, as seen in picture 1.

There is a smaller pediment above the chapel door, as may be seen in picture 1. The plan for this is given full size in picture 11, and we therefore make our model the same size as the plan. We bend it up exactly as we did the large pediment, and as seen in picture 10. We glue this above the door, as shown in picture 1. Then the step in front of the door is shown in plan in picture 12, which is given full size. When cut out and folded up, it will be as shown in picture 13, which shows it from the back as well as from the front. Its position below the door is seen in the general view in picture 1.

We now make neat round columns, or pillars, one for each side of the front door. The plan in picture 14, which is full size, is for both the tops and the bottoms of the two round pillars seen in picture 1. We therefore draw this plan four times on our card, making it the same size as in picture 14.

When being bent into position, the column ends will look like picture 15. The columns proper, which go between the top and bottom pieces, are made round by bending them round an ordinary lead pencil.

First we draw and cut out twice the plan in picture 16, to give us two columns. The picture is half-scale, so that we use scale-rule B to take our measurements, and the full-sized rule to make our lines on the card. Picture 17 shows the pillar being bent round the lead pencil. The card must be folded round the pencil tightly, and the last half-inch or so, where the card goes over itself, must be glued so as to make a tiny tube. We must be careful, however, to see that no glue goes on the pencil itself, or we should not be able to withdraw it afterwards. When the glue has set, we take out the pencil, which should be easily done. There would be no harm in leaving the pencil in the pillars if we cut it off so as to be the exact length of the cardboard covering. We glue to the building the four small pieces which we made from the

plan in picture 14. Their position is seen in picture 1. Then we put a little glue on the ends of the two pillars that we have made, and slip them into their proper places, as shown also in picture 1. That completes the structural part of the front.

We now turn to the interior, and make the lobby. The plan of this is shown in picture 18, and its position, when completed and fixed, is seen in picture 19. The plan in picture 18 is half-scale, so that we use scale-rule B to take our sizes, but, of course, make our drawing with the full-sized rule. When we have cut out the card and are bending it up it will appear like picture 20, and when properly glued to the inside of the chapel at the door it will be like picture 19. As we left one side of the chapel wall to open, we can attach the lobby and also the pulpit that we are about to make without much difficulty.

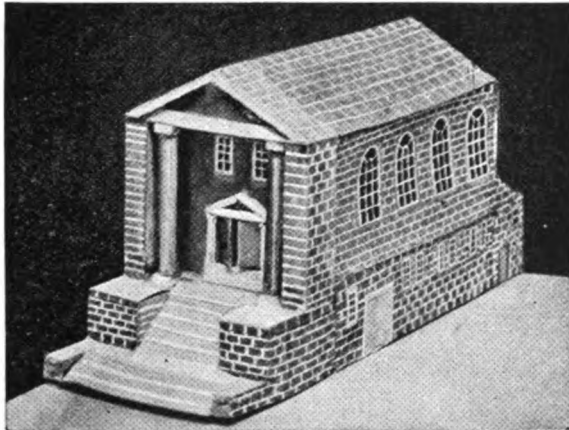
We have now only the pulpit to make in order to complete the interior of the chapel. The plan is shown full size in picture 21. Therefore, when cutting it out, we use only the full-sized rule both for taking the sizes

from the picture and in making the drawing. The pulpit, when being bent up, will be like picture 22. We must notice that the dotted lines with the small circles at end have to be half cut through on the opposite side of the card from the drawing, so as to be bent in the opposite direction. The plan in picture 4 shows where the pulpit is to be placed, and picture 1 shows it glued into position.

To make the pulpit properly we must be careful to fit the corners neatly, because, if we do not join them exactly, the pulpit will look twisted. We could not expect a preacher in Model-town to preach from a twisted pulpit.

We have now only the store-room to make and attach. The plan in picture 23 is half-scale, so that we use rule B to take the measurements. When cut out and being folded up, the store-room will be as seen in picture 24, and when attached to the building the whole will look as seen in picture 2. This completes the building of our chapel. We can finish it in any way we find artistic. This style of building will look very well if the walls are made red, the windows the usual blue, the doors green, and the roof dark grey to imitate slate. The last picture is a photograph of a chapel made from the instructions which we have just followed.

Our next task will be the building of a parsonage in which the minister in charge of our chapel may live.



MODEL TOWN CHAPEL, MADE AS HERE DESCRIBED

SIMPLE KITES AND HOW TO MAKE THEM

THERE are many different kinds of kites. Some are very simple, and these we shall see how to make in this article. Others are made to resemble ships, dragons, and other things, and for the way to make these readers must consult the index.

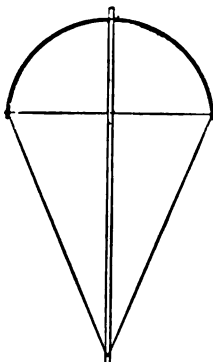
The ordinary kite is made with very simple materials, and its manufacture costs very little indeed. First, we require the half of a hoop. The size of the hoop depends upon the size of kite we are going to make, or, rather, the size of kite that we shall have will depend upon the size of hoop that we use. A hoop from a butter-keg will do very well for a small kite, and any grocer will be glad to give us one if we ask him, without expecting any payment for it. We do not use the whole hoop, but only a piece a little smaller than half of it. We choose the best part for this purpose, and cut away the remainder. Then we thin the half-hoop with a pocket-knife, taking care not to take off enough to weaken it much. We



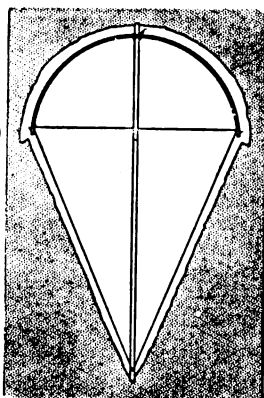
1. Testing the top



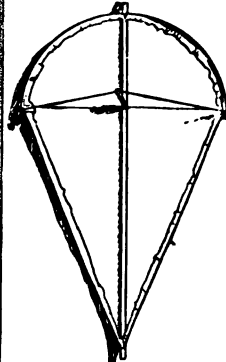
2. Top with notches



3. Frame of kite



4. Cutting the paper



5. Strut in position

outside of the half-hoop, then cut it off to the exact length of the half-hoop. Double the string then, and again put it round the half-hoop as far as it will go from one end. Make a notch with the penknife where the end of the doubled string comes. Then balance the half-hoop on the edge of the knife-blade at this point, as seen in picture 1. If the half-hoop hangs evenly, and does not hang down at one end more than at the other, it is all right; but, if one end hangs down more than the other, we must shave a little more wood from the heavier end, so as to make it the same weight as the other end. When we have got the half-hoop thinned properly and balanced, we make a notch at each side of each end, close to the end, as seen in picture 2, and put it

aside till the backbone of the kite is ready. We require for the backbone a length of wood that will be strong and light. A piece of thin cane will do nicely if it is rather stiff.

But a long slip of wood—say, from 24 to 30 inches long—will do about as well. We thin and smooth this slip, and then tie it to the notch in the centre of the half-hoop, so as to leave 1 inch sticking up beyond the top of the half-hoop. Picture 3 shows the kite at a later stage, but shows also the position of the hoop and the backbone. Now tie a thin, strong string to one end of the half-hoop, or top, as we shall now call it, at one of the end notches, pass the string once round the backbone, and the other end tie to the notch in the opposite end of the top. Balance the whole by placing one end of the backbone on one forefinger, and the other end of the backbone on the forefinger of the other hand. We can then see if the top swings heavier at one side than at the other. If one side is heavier, we move the backbone along the string a little bit,

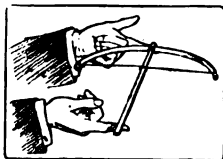
until we find from the swing that it is right in the middle between the two ends of the top. Picture 6 shows how we test the balance.

Having done this, we join each end of the top with string to the bottom end of

the backbone, where we put a notch or a hole to receive the string. The kite now looks like picture 3. All the strings should be fairly tight.

We now get a large sheet of thin, strong paper. A sheet of a large newspaper would do, but imitation parchment paper, if we can get it, is stronger and better. The paper must be large enough to cover the entire kite from top to bottom and from side to side. If the only paper we can get is in too small sheets, we can make one sheet large enough by pasting two or more pieces together at their edges.

We place the kite on the top of the paper, on a table or on the floor, and, with a pencil, draw a line round the kite, about 1 inch outside the hoop top, and $\frac{1}{2}$ inch outside the



6. Testing the balance

string sides, as seen in picture 4. Paste or gum the edges of the paper, and fold it over, and stick it down. Turn it over carefully, and stick on two or three patches on the back, thereby sticking the backbone to the covering paper and strengthening it. The kite is made, and we may prepare to fly it.

Tie a string at the back from side to side, from one end of the top to the other end of the top. Take a piece of wood about 4 inches long, and, having cut a notch in each end of it, fit it between this string and the backbone with one end on each. From the back, the kite will now look like picture 5

Tie a string from top to bottom of the backbone in front. This is the bridle. It must be slack, so that the kite will fly properly.

Tie another piece of string to the lower end of the backbone and let it hang loose—say, about 5 yards long. This is the tail. Make some loops in the tail right down, 2 feet apart, and put in tufts of paper, and then pull the loops tight. These tufts are streamers, and make the kite look well when we fly it.

The kite is now ready for the field. We take it out when the wind is fairly strong.

We should have a ball of string, or more than one ball, wound upon a stick. Tie the end of this string to the bridle so that the kite hangs horizontal when suspended, and tie a piece of turf to the end of the tail. One boy takes the kite by the bottom end, leaving the

tail lying free. Another boy takes the ball of string to which the kite is tied, and goes away about 10 yards in the direction from which the wind is blowing. Both stand and wait for a breeze.

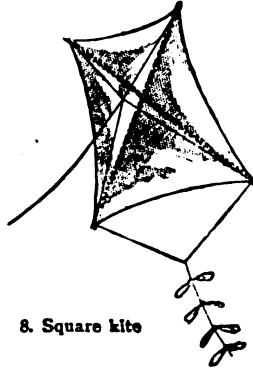
Then, as the boy with the kite cries "Go!" he throws the kite violently forward into the air, and his friend runs his best. Then, if it has all been properly done, the kite soars aloft steadily in the wind, and the string can be let out carefully and gradually. If the kite does not rise, the tail may be too heavy, and some of the turf must be taken off. If it wobbles, or rushes from side to side, the tail may be too light, and a heavier piece

of turf must be put on the tail.

That is, perhaps, the simplest form of kite. A square kite is another very simple shape, and is shown in picture 8. From this picture, and from the description of how to make the kite we have seen, we can make a square kite without further instructions.



7. Flying the kite



8. Square kite

EMBROIDERING A POCKET-HANDKERCHIEF

HANDKERCHIEFS may be spoilt by unsightly marking, and it certainly is a pity to ruin a beautiful white cambric one by blotched initials in ink. Let us see how the marking may be plainly and yet artistically done in embroidery.

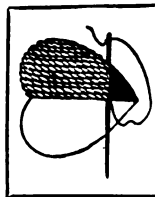
We can buy a dainty hemstitched handkerchief for 25 cents, and all we shall then require will be a pair of hoops and a spool of ordinary embroidery thread, and, if we cannot draw ourselves, a transfer design for the corner of a handkerchief (some small design such as shamrocks or forget-me-nots is most suitable) and some initials. These would cost but a few cents.

We shall, perhaps, find it easier to start with initials instead of a monogram, which is, of course, two or more letters twined together.

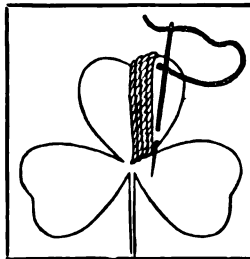
We will start by pinning the pattern across one corner of the handkerchief, taking care that the shiny side is lying on the cambric. This we must press with a moderately hot iron.

We then remove the paper and pin the initials inside the circle of shamrocks that we have ironed on to the corner.

To embroider handkerchiefs successfully we take the two small wooden hoops, which fit tightly over one another, stretching the design over the smaller one and fastening the larger over the handkerchief, so that now the cambric looks like the top of a drum or a tambourine. Working on hoops will keep us from puckering the work, and until we have had a little practice this is difficult to avoid.



Satin stitch

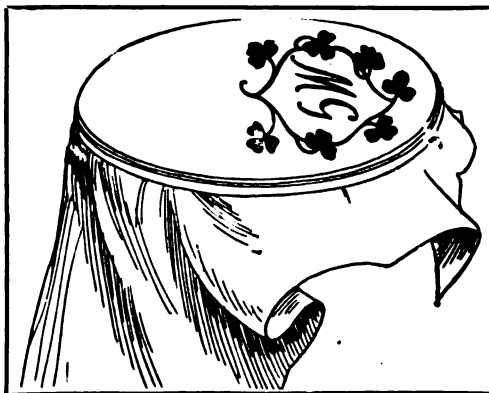


Padding the leaves

When these preparations are made, we can begin the actual work. First we cut a short thread from our spool, and we find that each thread is divided into several strands. Let us thread our needle with four of these strands to do the padding. We pad the flowers and letters to raise them up and to make them firm.

Suppose we are going to work shamrocks round our initials. These are three small leaves of

about the same size joined together on one stem, and a line or vein runs down the centre of each leaf. Our first work will be to pad the leaves by taking a tiny stitch at the bottom of the right-hand half of the leaf, and with the thread lying across the leaf making another small stitch at the top, again leaving the thread on the upper side of the work, and crossing over the first stitch. And so we go on crossing the stitches on the right side, weaving the needle in and out till the half-leaf is padded thickly in the middle and thinly at the sides. The line for the vein must be left distinct. We can then pad the other half of the leaf in the same way. Now we must begin to work over the padding with satin stitch, very evenly, beginning at the bottom of the right-hand side of the leaf, and working



The finished corner on the embroidering frame

to the top, and then from the top of the left-hand side to the bottom, so that these stitches go the reverse way to those of the padding. We put them very close together so that

none of the padding shows through, with the line down the middle clear.

When we have finished the leaves, we can work the stalks over and over the blue line with tiny stitches, and as near together and as even as possible.

At last we can begin the initials. Pad the thick parts of these letters carefully, taking only two strands of thread in the needle. We must pad, too, with small stitches, and weave

them over one another so as to keep them smooth. Then we work them over from left to right with satin stitch, using two strands of thread and placing each stitch close to the other. Work the full-stop with tiny satin stitch.

HOW THE CONJURER MAKES HIS MONEY

EVERY boy has a liking for bright dimes, so I am going to tell you a way of making them for yourselves, not imitation coins, but real good money. The only drawback about the process is that each dime you make costs the same amount to produce, but you need not tell your friends that.

To coin money, of course, you need a "die." The die, in this case, is in two parts, as illustrated in picture 1—a sort of little anvil (A) and a cover (B), the one fitting over the other. With this are used three "banks" of bright metal, supposed to be silver, but in reality tin. To show the trick, you put one of these on A, which is just large enough to receive it, and cover it with B. You stamp it by bringing down one end of your magic wand smartly upon it. If you don't happen to have a magic wand, a ruler or even a lead pencil will do just as well. You now lift off the upper die, when the blank is found to be transformed into a bright dime. You take this off, put another blank on the little anvil, cover it, and stamp it as before. When the upper die is lifted, the second blank has been coined into a dime. Once more the process is repeated, and a third dime is the result. The secret lies in the construction of the little anvil (A). This looks like a solid bit of brass, but it isn't. Instead of being all in one piece, as it appears to be, it consists of four distinct parts (A, C, D, E),

as shown in picture 2. These are, in fact, mere shells, fitting one over the other in regular order. The cover (B) has no speciality.

To prepare for the trick you must, in the first place, provide yourself with three ten-cent pieces, the newer and the brighter the better. One of these you place on A, and cover it with C.

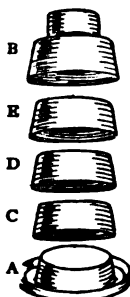
You place another dime on C, and cover it with D; and, lastly, place the third coin on D, and cover it with E. So arranged, the whole looks exactly as A does in our first picture.

To show the trick, you lay the first of your blanks on E, and cover it with B. After stamping it as already described, you lift off B, pressing its sides lightly. The effect of this is that E comes away inside B, carrying off the blank between them, and leaving the uppermost dime exposed. The process is repeated for each dime.

The little apparatus, which is known as the Magic Mint, and is sold at 25 cents, is so neatly made that, when du'y prepared with the needful dimes, you need have no fear, unless you are exceptionally clumsy, of lifting off more than the proper shell or shells. A hint may be given to the grown-up reader. Apart from its attraction for the juvenile performer, this will be found an admirable trick for exhibition by good-natured uncles or other relatives, the dimes being in this case presented to the spectators, proof positive of "no deception."



1. The conjurer's mint



2. The anvil

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO AT THE END OF AUGUST

EVERYBODY admires those beautiful up-standing white lilies, often called the "Madonna lily," that flower so well in certain gardens. You will want a clump of them in your garden, and the present time is the best to move them.

We have only to wait until the flower-stem pulls away quite easily to know that the bulb below has gone to rest. This it does only a very short time, and long before the autumn has gone they will send up fresh glossy green leaves. The right thing is to catch them just at the time when they are making no growth, when they will not feel the check of transplanting.

If stable manure is put into the hole dug to receive them, it should be well mixed with the soil, and for two or three inches below the depth the lilies are to be planted, soil and no manure should be placed. The best manure for the purpose is that which, earlier in the year, has been used for a hot-bed, for rank, fresh manure should never come anywhere near your lily-roots.

We need not be afraid to plant these lilies in a border that gets very dry in summer, so

flower that we call carlina. If you can find this plant growing in any park, or anywhere that you can notice it from time to time, do so. The silvery flowers open only when the sun is upon them; and it is said that they close so regularly at the approach of rain that the Germans call them weather prophets. They are quite easy to grow from seed.

We shall wish to pick all the flowering stems of our sweet-smelling lavender, and we ought not to wait until the flowers are past their best. Some of us will like to make lavender bags to put in our linen drawers; in that case we should gather the heads on some fine, warm day when they are quite dry, and, having rubbed them free of the stalks, we may sew them up in bags.

The gladiolus, which in the plural we call gladioli, will be among the gayest flowers of the garden at this time. They will require plenty of water if the weather is dry, and when the flowers have faded the flower-stem should be cut out. Unless they are especially needed for sowing, it is better not to let the seeds form, as the ripening of these requires a good deal of the strength of the bulb below.



Carlina

Gladioli

Madonna lily

long as they get plenty of moisture during the earlier months of their growing period; that, at any rate, is my experience after experimenting with them.

Talking of experimenting reminds me that this is one of the great joys of gardening; if a plant looks sickly and refuses to flower well, and you have it growing in a shady place, just mark that plant, and make up your mind that as soon as the autumn arrives you will dig it up, and try it in a more sunny position. Or perhaps you have a plant that at present is growing in too sunny and dry a position, and seems to be longing for cooler quarters—well, let these two change places, and next year notice the result.

By this time the dahlias will be opening their flowers, and in many British gardens earwigs become a woeful pest. Fortunately we do not have this troublesome kind of insect in the United States. Here and elsewhere, however, the tarnished plant bug is responsible for one-sided flowers and blasted buds, causing them to die, but otherwise dahlias have few enemies.

Some flowers do not fade, and for a long while may be used in winter bouquets. Such are the sea-lavenders, that we generally know as *statice*, everlasting flowers, and a curious thistle-like plant bearing a silvery

Some people *do* grow even the plants that have bulb roots from seed, but in most cases it is a long business, as most bulbous plants, as we call them, require *three* years from the time they are seedlings to the time they flower.

You have already been told to pull off the pods from the sweet peas, but it should be added that this requires careful doing. Whether we are picking peas for the vegetable tureen, or peas from our row of sweet peas, which are certainly not for the vegetable tureen, it will *not* do to take the pod between the fingers and pull or jerk it off. No, indeed, because the chances are that in pulling off the pod we pull up the whole plant by the root. The right way is to use both hands—with the left hand take hold of the stem below the pod, and with the right pull it off.

By this time in the summer our plants will have become large, and even yet we may have a few things that have not yet begun to flower, such as the late-sown French marigolds, perhaps, and the Michaelmas daisies, and chrysanthemums. If any of the plants that are ceasing to flower are crowding upon these, it is well to cut them back and give room and air to those plants yet to flower.

We should always be taking thought for our plants, humouring them, as it were, and tempting them to do their best.

MORE KINDS OF WOOD JOINTS

THE joints which have so far been described on page 1345 are not suitable for every kind of woodwork. Others are wanted for thin or shallow articles, and these we are now going to show how to make.

MORTISES AND TENONS.

Think of the joints of a common door as shown in picture 20. You can see, if you look at its edge, that projecting parts on the rails or cross bars come right through the upright pieces. The projections are *tenons* and the holes are *mortises*. You see that the object sought is not only to make a very strong fitting of the corners, but also to secure the strongest directions of the grain. For just suppose that a door were cut out of a very wide board, or glued in two widths of board, you know that it would curve and shrink and crack in the warm house. It might be stiffened with cleats or strengthening pieces as back doors are, and as shown in picture 31, but of course that would be too unsightly for the rooms. It is made by framing together with mortise and tenon joints, and this gives long grain both up and down and across the door; so it will retain its shape and dimensions for a hundred years. Many other articles besides doors may be made by the aid of this very useful joint. You will notice that the central portions of a door are filled in with *panels* of thin wood. They are not nailed, or tenoned, or glued, but fitted into grooves in the bars; consequently they are free to shrink, without splitting. *Mouldings* are generally fitted round the panels only because they look nicer than plain edges. The corners of the mouldings are fitted with mitred joints, and they are fastened in with glue or nails.

There are numerous differences in the forms of tenons, varying with their position and the dimensions of the wood. They are fitted not only at corners, but away from ends, and the tenon may go right through, or only a portion of the way.

The tenon in picture 21 is glued, and

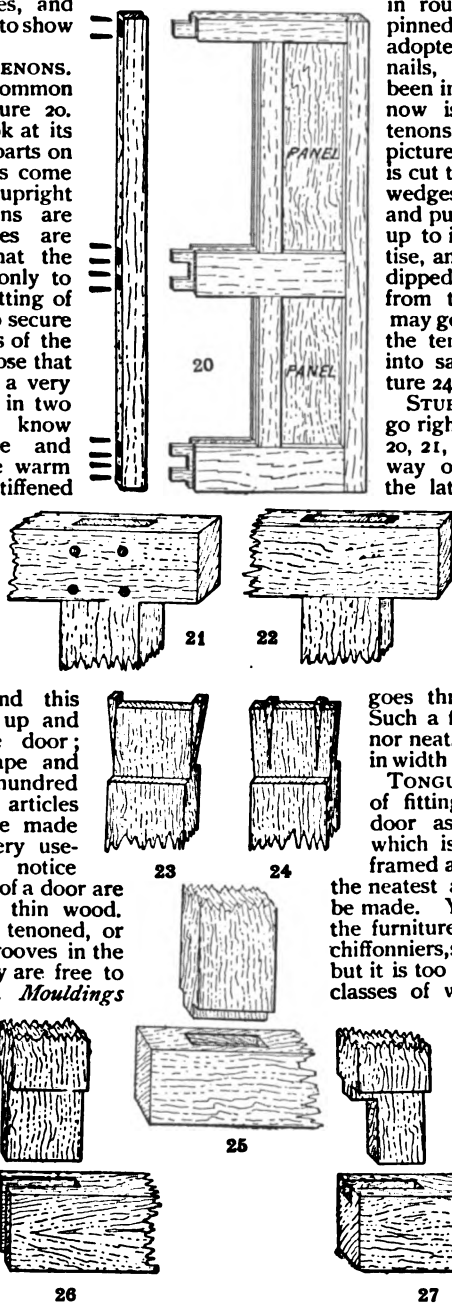
secured also by driving pins or wood pegs through from one face. Sometimes these are used without glue. It is chiefly large joints in rough carpentry that are pinned. This is the old method, adopted before such things as nails, screws, or bolts had been invented. The usual way now is to glue and wedge tenons into their mortises as in picture 22, where the mortise is cut tapering to allow for the wedges. The tenon is glued, and pulled, or *cramped* tightly up to its shoulder in the mortise, and then the wedges are dipped in glue and driven in from the outside. Wedges may go either at the edges of the tenon as in picture 23, or into sawcuts in it as in picture 24

STUB TENONS. Tenons may go right through as in pictures 20, 21, 22, or a portion of the way only as in 25, being in the latter case termed *stub* or *stump* tenons. These joints are used generally away from ends when the strength of the structure does not depend on them, but on other joints.

END TENONS. An end tenon seldom goes through as in picture 26. Such a fitting is neither strong nor neat. The tenon is reduced in width as in pictures 20 and 27.

TONGUED JOINTS. The method of fitting the panels into the door as in picture 20 is one which is used very much. A framed and panelled structure is the neatest and strongest which can be made. You can see examples in the furniture in your house, in the chiffonniers, sideboards, and cabinets, but it is too costly for some cheaper classes of work. If the carpenter comes to build a little office in one corner of your father's warehouse, or to divide one bedroom into two smaller ones, he does not generally frame the partitions like a door. He uses matchboarding as shown on end in picture 28. Here narrow boards are laid edge to edge, and

all the edges fit each other by tongued joints. The boards are thus kept nicely level by the tongues fitting into the grooves, and the whole like one great broad piece of wood. Yet



they do not shrink or crack, because each piece is very narrow.

The tongues and grooves are made in various shapes, but the most common is the plain form shown. In this the tongue is planed on one edge of the board, and the groove is *ploughed* out of the other. Sometimes both edges are grooved, and the tongue is a separate strip of wood fitting half-way into each. This is the usual way when tongued joints are planed by hand. In picture 29 the pieces are separated, but the tongue is in the lower groove. Sometimes such a joint is glued, and sometimes put together without it.

Partitions and floor-boards are not glued, but smaller work generally is. Edge glued joints are often made plain without tongues, but are much stronger with them.

Another example of tonguing is shown in picture 30. Its object here is not to increase the width of the wood by joining edge to edge, but to prevent a broad piece from warping by fitting cleats to its ends. Drawing-boards are usually made like this. Another way both to prevent warping and to hold boards edge to edge is to screw or nail

You see at once a resemblance to the tenon and mortise. The round dowel does not cut away too much wood, and when glued properly, it makes a joint as strong as solid

wood. A well-made chair is good for a generation. Dowels are suitable for joining all slender parts, and are often used instead of tongues for edge joints, as in picture 32. They are not quite so good as a tongue, but are used because they are hidden, while a tongue shows at the ends of the boards.

FISHED JOINTS. Sometimes you may want to join two pieces together by their ends, as you joint up your fishing-rod. You know how

easily these joints work loose. So they would in large pieces of timber unless they were made with much care. The carpenter

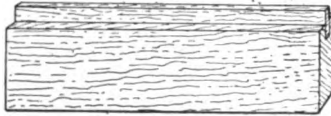
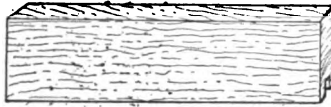
makes them as strong as solid pieces, by means of what he calls *fished* joints. He may abut the ends simply to touch each other, or lap them sloping, which is called *scarfing*, or notch them, which is called *jogging*. But in nearly every case he secures the joint by the

aid of pieces of wood or iron bolted along the sides. These cover the joints on both sides, and bolts go right through them and

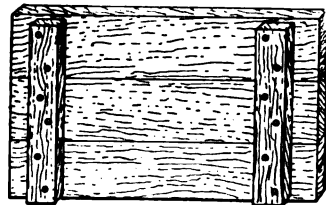
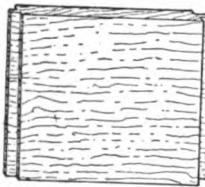
the pieces which they unite. The effect is just as though you mended a broken stick by laying strips on each side, and bound them tightly with string.



28

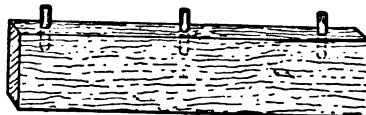
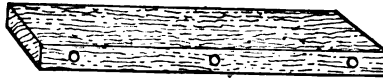


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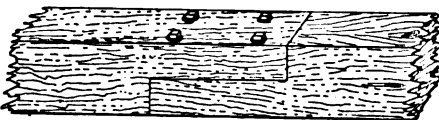


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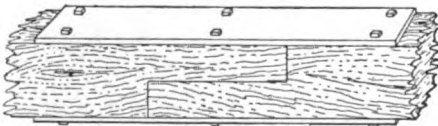
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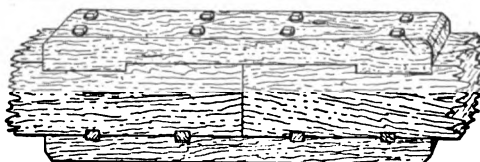
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34



35



36

a much stronger way than that in 30, but 30 is neater.

THE DOWELLED JOINT. If you happen to have a broken chair in the house, one of those with the light-looking curved backs, you will see another kind of joint. A round pin on one part fits a hole in the other.

There are at least twenty different ways in which these joints are varied in shape, but all have a family resemblance to the illustrations.

Picture 33 is a plain lap; 34 is a lap with covering plates or *fish* plates; 35 is a scarfed and keyed joint, and 36 a fished and jogged joint.

LITTLE PROBLEMS FOR CLEVER PEOPLE

THESE problems are continued from page 1349, and the answers below refer to the problems on that page.

WHAT IS THE QUESTION?

70 "There is one question to which you must always answer 'Yes' if your answer is correct," said Harold.

What is the question?

WHAT DID THE HANDKERCHIEFS COST?

71. A draper sold ladies' handkerchiefs at 9 cts. each or three for 24 cts. One day he saw his assistant sell a lady one handkerchief, and he said, "Why did you not sell the lady three handkerchiefs?" "Because," said the assistant, "you have the same profit on one as you have on three."

What did the handkerchiefs cost the draper?

HOW MUCH LUGGAGE ALLOWED?

72 "I shall have to pay 6s. 3d. on excess luggage," said Brown, waiting for the train with his friend Smith. "Let me take some of it for you," said Smith, and he took 120 lb. of it. Smith was charged 10d. excess, and Brown for his share paid 1s. 3d. excess.

How much luggage was allowed free, and what was the total weight of luggage?

HOW MUCH COAL DID BLACK BUY?

73 Said Mr. Black: "By ordering coal direct from the pit, I get 21 cwt. for a ton, and on my last order, when coal was \$6.00 a ton, I saved \$3.60."

How much coal did he buy?

HOW MANY PASSENGERS?

74 "I will take you for 25 cts. each," said the boatman at the ferry. "Will you take two more and make it 20 cts. each?" asked a passenger. "Yes," answered the boatman; "I shall make 10 cts. more if I do."

How many passengers were taken altogether?

WHAT TIME WAS IT?

75 The clock on the church tower takes the same time to make three strokes as the town-hall clock takes to make two strokes. "As I came home," said Jones, "they began to strike the hour at the same instant, and the last stroke of the church clock came exactly at the last stroke but two of the town clock."

What time was it?

THE ANSWERS TO THE PROBLEMS ON PAGE 1349

64. Three dozen pens and five dozen knives would be the same price as 13 dozen pens, seeing that the knives were double the price of the pens. Three dozen knives and five dozen pens would be the same price as 11 dozen pens. The difference in price between 13 dozen pens and 11 dozen pens was \$2.88, so two dozen pens cost \$2.88, or one pen cost 12c. and 1 knife cost 24c., or twice the price of a pen. The work may be proved. Three doz. pens at \$1.44 a doz. and 5 doz. at \$2.88 a doz. come to \$18.72; 3 doz. knives at \$2.88 and 5 doz. pens at \$1.44 would have cost \$15.84, and the difference is \$2.88.

65. The express train takes one hour to travel 40 miles, and the excursion train takes one hour and 20 minutes to travel 40 miles. By the express train the fare is $\frac{1}{4}$ d. per mile more, or 10d. for 40 miles, and the saving in time is 20 minutes. The traveller finds that the saving in time is just equal to the extra charge, so that his time is worth 10d. for each 20 minutes, or 2s. 6d. per hour.

66 The word "untied," which is "untied" with the two middle letters changed.

67 Harry began at the end and found that 3 is the only figure which when multiplied into 215 gives 4 in the second figure, so that the third figure in the quotient was 3. As the first figure in the quotient is 1, the line below the dividend is 215. The sum stands:

$$\begin{array}{r} 215 \times 7 \times 96 (1 \times 3) \\ 215 \\ \times 5 \times 9 \\ \times 5 \times 5 \\ \hline 645 \\ 645 \\ \hline \end{array}$$

The first figure in the dividend must be a 3, because when 2 is subtracted from it some-

thing remains. This gives the first remainder as 15×9 . Obviously the middle figure in the quotient must be 7, and the second multiple in the sum must therefore be 1505. The figure below the 0 is 6, so that the figure above it must also be 6, and the middle figure in the dividend must be 1. Thus the entire sum is now like this:

$$\begin{array}{r} 215 \overline{) 37195 (173} \\ 215 \\ \hline 1569 \\ 1505 \\ \hline 645 \\ 645 \\ \hline \end{array}$$

68 Hicks walked for nine days, and as he walked 117 miles altogether his average was 13 miles. As his increase was regular each day, he must have walked the exact average on the middle day—namely, the fifth day. Thus on the 6th, 7th, 8th, and 9th days he must have walked 14, 15, 16, and 17 miles, and on the 4th, 3rd, 2nd, and 1st days he must have walked 12, 11, 10, and 9 miles. By adding these figures together we get 117 miles, which shows that the answer is correct.

69 One-quarter added to one-third is seven-twelfths, and the difference between seven-twelfths and half, which is six-twelfths, is one-twelfth of the whole. But Fred said that this difference was ten marbles, so that the total number of marbles must have been 120, or twelve times ten marbles. We can prove the answer by adding one-quarter and one-third, which make 70, and this number is ten more than half the number of marbles.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 1607



BIRDS THAT SERVE US

SEEING that men have tamed horses and cattle, elephants, camels, and many other wild animals for our service, it is not wonderful that they should have tamed birds also, to live about our homes. Fowls and ducks and geese are so common that any farmyard would seem strange without them. Yet they come from birds which once were as wild as the eagle.

Except for one or two varieties of fowls, the Brahmas and Cochins for example, we can point to the wild birds of the woods and jungles of India, Ceylon, and elsewhere and say: "These wild birds are descended from exactly the same families of birds from which our tame fowls came."

We can trace the parentage of ducks and geese in the same way, and that of the majestic swan, which remains still like the beautiful wild creatures from which it descended. Pheasants and partridges, which are now reared by hand, become wild when they grow up; and many other birds which help to feed us, though they owe their power to live to the efforts of man to preserve them, are as wild as the wildest birds that haunt the

CONTINUED FROM 1430



jungles of India and Africa. There are dozens of breeds of fowls, and the number keeps on growing. Anybody with skill and patience can create new varieties. We could take the biggest fowls, the Cochins

or the Malays, and get a race of tiny bantams from them. The smallest eggs of the big birds are taken for hatching, and the smallest eggs from the hens from that brood are kept. Always the smallest birds and their smallest eggs are kept, so that in time the size of the great bird dwindles down to the tiny bantam, which may become like the Japanese midgets, weighing no more than a pound each.

The size and habits of a bird can be changed by methods of selection. Birds which lay many eggs may be mated with birds of great size. The result will be a breed of fowls which grow large and lay many eggs. Birds may be wanted chiefly for the amount of flesh they have. That class of fowls can be obtained in the same way. Then there are birds wanted only for their eggs. Those are taken which lay most and are readiest to leave the hatching of the eggs to other birds. Quite new varieties can be obtained in this way.

The Romans first brought fowls to Great Britain, whence they came to this country; but the fowls have been so long tamed, they would soon run wild if neglected. It often happens that a hen will stray away from the others and lay her eggs secretly in a rough nest of her own making in the hay-mow. She returns day after day until the nest is full of eggs. Then she will sit on them for three weeks until the chickens hatch, and return in triumph with her little ones to the farmyard.

THE BEST CHICKENS ARE THOSE RAISED BY THE MOTHER BIRD IN SECRET

It is a curious thing that, much as we know about poultry-raising, we cannot by the best-known means get healthier chicks than those which the mother bird herself hatches in secret. But many eggs are hatched without the help of the birds. They are put into a case called an incubator. This is kept warm day and night, and the mere heat of the incubator causes the eggs to hatch; thus little chickens come into the world and grow up and lay eggs without ever having known or seen their parents.

The habits and food of all are practically the same. Early in the morning they like a feed of warm barley-meal. During the day they eat corn, green-stuff, insects and worms, and much grit. The grit is necessary to enable them to grind up the hard corn which they eat, for, of course, they have to bolt their food, as they have no teeth. Their flesh is one of the most valuable forms of food we have, but their eggs are even more important. Eggs are required not only to be eaten as food, but to help in making scores of other things that we eat, including many preserved preparations, candies, and so on; and also for various other purposes, as chemistry and mechanics; so that millions are consumed daily, and eggs become important in commerce.

THE SAVAGE INSTINCT IN FOWLS AND THE CRUEL INSTINCT IN MEN

Some fowls are very savage, Malays and game fowls especially. The game birds used to be bred in great numbers in this country and kept solely for fighting. Rich men had cockpits built at their houses, and there were public dens for cock-fighting. Men would match their birds against other men's birds,

and then they would wager large sums on the result. The birds would fight to the death. It was a shamefully cruel sport, and happily it is now forbidden by law. Even to-day, however, it is secretly practised in the South and West, in some parts of which it is rare to find any but game birds in the poultry runs of the miners and other people in humble circumstances.

The fighting instinct in fowls is very strong. They fight fiercely if strange fowls are put into their runs. A hen with chickens will peck strange chickens to death; and chickens, if little ones like themselves are put in with them, will do their best to kill the strangers. Instinct tells them that if strangers come into their home, the strangers are robbers who must be driven away.

There does not seem much resemblance between the common fowl of the farmyard and the most magnificent of birds, the golden pheasant; but fowls, pheasants, grouse, guinea-fowls, partridges, quails and turkeys all belong to the same order. Still, there is no fear of our mistaking, say, a pheasant for a fowl.

THE FAMILY OF THE PHEASANTS, WHICH HAVE BEEN IN ENGLAND 1,000 YEARS

The pheasants are the handsomest wild birds we have of that type. The male bird is a beauty, with a splendid tail eighteen inches long, with a sheeny neck, and head of brown and green edged with yellow and a shimmer of green, blue, and deep orange. The female is not so gaily dressed, nor has she so long a tail. It is as well for her that she is of different appearance from her husband. When men seek the birds, the male pheasant, with his gorgeous feathers, has at once to fly, and so may be shot. The more soberly feathered hen sits close in the undergrowth, and matches so well with it that often she escapes notice. Should her mate be killed, she will join the family of another male, each of which has several wives.

The ordinary pheasants have been domesticated in England and in the neighbouring parts of the continent of Europe for more than a thousand years; and in addition several other sorts are kept here and there as park ornaments. All of these pheasants may be seen in zoological gardens and on some

large country estates in the United States, for they live well in the American climate; and in some places, especially in Oregon and Washington, the Mongolian pheasant has been set free, and is now abundant as a wild bird.

Some naturalists believe the phoenix, which the ancients thought visited Egypt only once every 500 years, was really a golden pheasant. It was supposed that the phoenix burnt itself on an altar, and that a young phoenix arose from the ashes of the old one. What makes people think that the phoenix was really the golden pheasant is the description of it as "the golden-haired bird." The golden pheasant's feathers do look like golden hair. The bird is a glowing mass of gold and crimson. If such a bird were seldom seen, it is quite possible that the ancients would believe it to be the golden-haired bird of their legend.

The golden pheasant has a rival for beauty in the silver pheasant, but it is more gentle than the latter. The silver pheasant, which thrives when brought here, proves quite the fiercest of the pheasant family, and though it is smaller than the strong common pheasant of England, it will drive away all other pheasants but its own family. We might expect the blood pheasants of Western China to be the best fighters of the family, for they have no fewer than four pairs of spurs on their coral-red legs; but the silver pheasant can master them all.

The number of varieties in pheasants is surprising. There is one called the tragopan, which is a scarlet beauty, with fleshy horns, above the eyes. Then there is a little family of pheasants called the monals, which are gorgeously coloured and have a crest of plumes on the head. The two kinds last named live in the mountain forests of Asia. Two sorts of fire-backed pheasants have backs covered

with fiery bronze-red, while their hens are black, with a gloss of purple and steel-blue. In Central and Eastern Asia we have eared pheasants, so called from the fact that the covers of the ears grow out into long white tufts of feathers. The tails of these birds are long and like a drooping fan, and resemble in texture the tail of the peacock. Strangest of all, perhaps, is the Amherst pheasant, a near relative of the golden pheasant, which has a sort of cape of feathers reaching from its beak right down to the root of its neck. It has an extraordinarily long tail, which sweeps like a feathery snake after it. The habits of all the



The cock that crows in the morn is busy all day long finding food for the hens and chicks. He is always ready to fight.

pheasants are much alike, no matter where they live. Those in England lay many eggs in rough nests on the ground. Keepers collect them and put the eggs under common hens, which hatch them. The baby pheasants grow up like chickens, and are fed by their keepers till they are able to fly away from the coops into the woods, there to mate, to roost in the trees at night, and to go in the day to the keeper when they hear his call with their food. In the end, if their owner is a cruel, lazy sportsman, too idle to hunt his game, they are driven by dogs to what is called a battue. They

have to fly over places where many men lie concealed with guns, and after all their careful rearing and feeding they are mercilessly shot down, so that men may boast of the numbers they have killed.

Now we must pass to the grouse, which include the grouse proper, the capercaillie, the blackcock, the ptarmigan, the ruffed and Canada grouse, the quails and the partridges. The grouse common in England and Scotland is the red grouse, really a ptarmigan. It is mainly reddish-brown, with lighter colours and black and white intermixed. The birds nest among the heather, and eat young shoots of heather and other growths, seeds, and so forth.

THE BEAUTIFUL FAMILY OF PHEASANTS



There are five species of eared pheasants. Long tufts of white feathers grow up from the ears, and so give them their name. They have loose, hairy plumage.



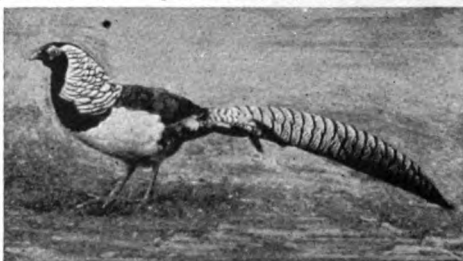
The tragopan, or horned pheasant, is another beautiful bird. When courting, it dances and bows, and struts and shakes the fleshy horns which are over its eyes.



The golden pheasant is not a big bird, but he is the most beautiful of all his family. It is supposed that the bird called by the ancients the phoenix was really a golden pheasant. These splendid birds can live in our climate.



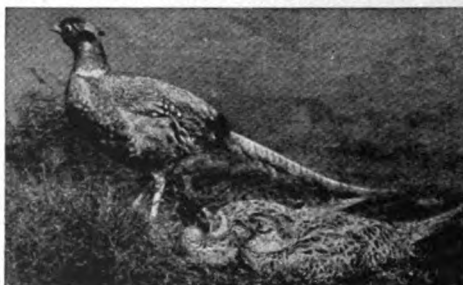
The silver pheasant looks like feathered moonlight. He is a beauty, but too savage to live with common pheasants. He can master all the other varieties.



The Amherst pheasant has a cape of feathers covering the back of the head and the neck, and a very long tail. Its home is in the mountains of Tibet and China.

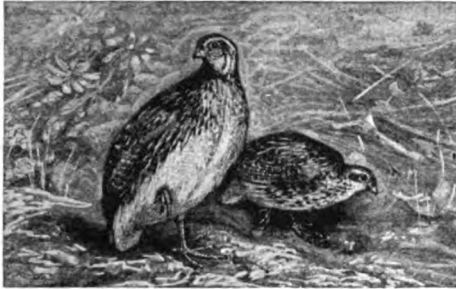


The peacock pheasant is a bird of rainbow colours with a tail covered with eye-like spots. It lives in the bamboo jungles and the wooded ravines of India and Burmah.



The ordinary British pheasant is one of their most splendid native birds. Its eggs are often hatched by poultry; and the pheasants are tame till they grow up.

BIRDS THAT ARE CRUELLY SHOT FOR SPORT



Quails were numerous in Egypt in the time of the Israelites. They still are so, and during their yearly migrations descend in swarms to cover the land.



The ptarmigan has three different dresses a year. In winter it is as white as the snow, which it loves, but it has dark plumage in summer and grey in autumn.



Partridges are divided into six species. Most of them nest on the ground, but some of them make their homes in trees. Thousands are cruelly shot every year.



Of the thirty species of grouse, the red grouse is the true British bird, and is found nowhere but there. It changes its plumage as the seasons change.



The golden plover is the handsomest of the plover family. It visits England, but wanders also over Russia and Norway, and in winter as far as South Africa.



The ruffed grouse of North America have a frill of feathers on each side of the neck. They make a great drumming sound with their wings in calling their mates.



Black-game is a species of grouse. The male bird is called the black-cock; the female is called the grey-hen. Much of their food consists of buds, leaves, and fruit.

They are protected by law, and most of them are looked after in the nesting season by the gamekeepers on great estates in order that when autumn comes the owners or renters of the estates may go out and shoot them. Grouse-shooting time is a season of great merriment among the rich country-people of Scotland, when all their friends are invited to join in the shooting in the morning, and in the house-parties in the evening.

A **AMERICAN GROUSE AND PTARMIGAN ARE MORE NUMEROUS AND FREE**

It was said that the Scotch red grouse or moor-fowl is a ptarmigan. Other ptarmigan abound in Northern Canada and in the high Rockies, where they form the principal prey of foxes, falcons, and other predatory animals, and one of the chief food-resources of the people of the cold north. They differ from the regular grouse mainly in having the winter coat white, and in having feathers on their feet to keep their toes warm in the snow.

America is rich in grouse, the finest of which is the ruffed grouse, so called because of the long feathers on the neck of the cock. In spite of the fact that it has been shot at steadily ever since the country began to be settled, it still persists in every piece of woods, its brown plumage enabling it to hide easily among the dead leaves. It lies perfectly still, trusting not to be seen until you almost step on it, then springs up with a tremendous noise of whirling wings, and spins out of sight as if it were a sort of bomb fired from a gun. It takes a cool and quick man to hit it under these startling circumstances. Frequently when one is rambling quietly in woody places, especially in the cool, quiet October days, one hears a dull roar which sounds like muffled drumming; and if one is careful, or lucky, or both one may see a cock of the ruffed grouse standing on a dead resounding log, and flapping his wings so rapidly that they make only a blur of light. He is the drummer; and it is a really wonderful performance.

Very similar is the western grouse, known to all gunners as prairie chickens, only they live on the prairies and not in forests. In the northern United States and Canada are several other handsome grouse, which spend most of their time in trees, feeding on spruce

buds, etc.; but all the grouse make their nests on the ground.

The biggest of all the grouse is the capercaillie, the males, when fully grown, being almost the size of a turkey. Like the ptarmigan, its legs and feet are feathered. Its habits are like those of the pheasant and grouse.

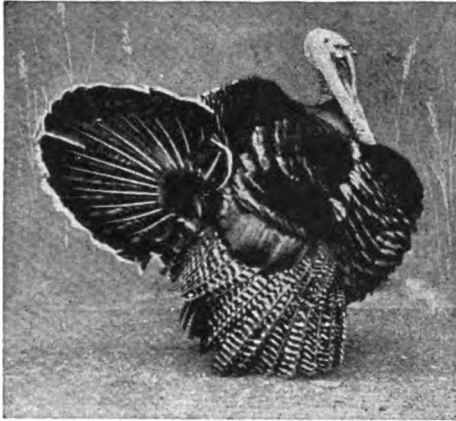
H **OW THE MALE BIRDS STALK AND PRANCE ABOUT TO ATTRACT ATTENTION**

All the male birds we have been reading of have finer feathers than the females. The reason is that the hens love the males which have the handsomest appearance. The males spread their tails, and stalk and prance in the most comical way to attract the attention of the female birds whose admiration they wish to win. The black-cock calls his lady friends with a noise like the sharpening of a scythe. The grouse so rapidly beats the air with his wings that the noise is called drumming. The capercaillie woos his love by the aid of his voice, and fights savagely with other male birds who dispute his choice.

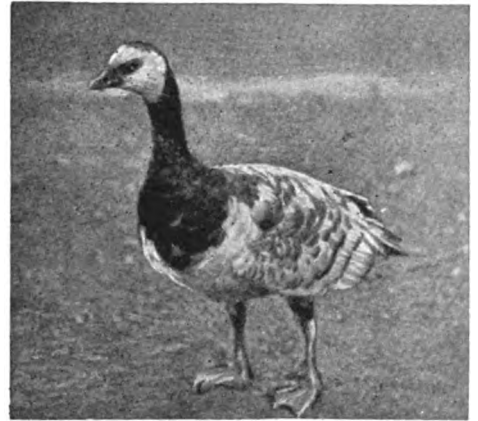
The partridge is the most plentiful of game birds in this country. It is well for it that it multiplies so rapidly, for sportsmen shoot it in swarms every shooting season. It is a bird that we are bound to admire for the love which it shows for its little ones, and the skill with which it draws away their enemies. The nest lies in the grass or undergrowth; and, suppose a dog approaches, out flutters the mother partridge, just in front of the dog's nose. She flutters slowly, just ahead of him, as if she had a broken wing. The dog follows her, thinking that he is going to make an easy catch. But she keeps always a little ahead until she has drawn him far enough away from her babies. Then she rises and sails away like the wind.

In this trick the partridge has a close imitator in the plover, a bird which is to be found everywhere. Our most common variety is the golden plover, a handsome bird, which makes a nest on the ground, and, when the little ones are hatched, makes the most frantic efforts to save them from an enemy. The birds will fly round and round the head of a man whom they fear, and he quite expects them to peck at his eyes. They will drop to the ground and run. Anything which can draw him away from the nest these clever, loving birds do.

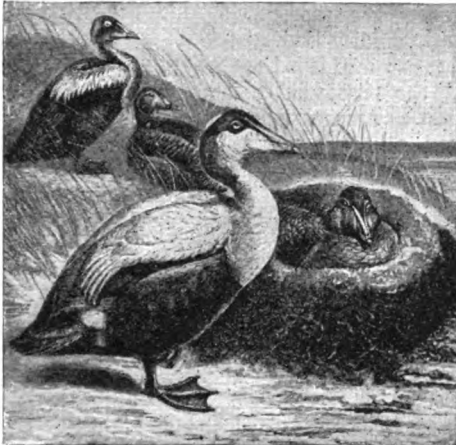
A GROUP OF TURKEYS, DUCKS, AND GEESE



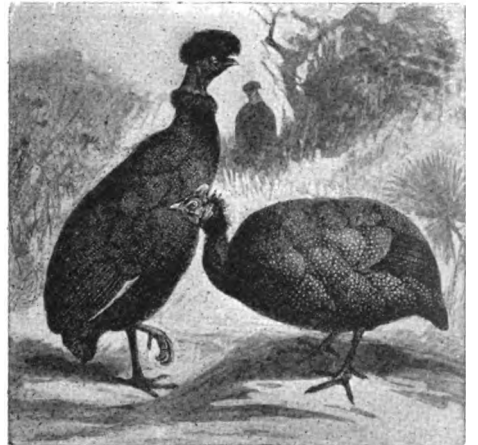
European turkeys came from Mexico, but have long been tamed. The wild turkeys fly well, and swim any river which they want to cross when tired.



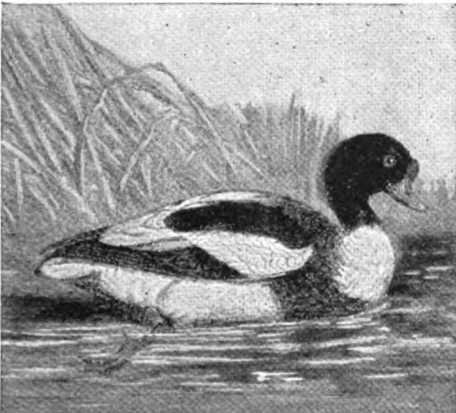
The barnacle-geese was believed by old-time sailors to be hatched from barnacles, so they gave it the name by which it is still called. It avoids men very cleverly.



Eider-ducks line their nests with beautiful white down plucked from their own bodies. This is collected to make bedding for men and women.



Crested and common guinea-fowls are found in Africa, where they are numerous. They thrive here, and are valued as food, but a guinea-fowl is a noisy nuisance.



The sheldrake loves sandy places near the sea. Here it finds holes made by rabbits, and in these it lays its eggs. It is called, therefore, the burrow-duck.

The photographs on these pages are by Charles and William Reid, Lewis Medland, W. P. Dando, and others.



The brush-turkey scratches up great mounds of vegetation, and in these places its eggs. The heat of the vegetation hatches them without trouble to the bird.

The smallest of the partridges is the quail. These birds are strange little things, looking at a distance like fat, diminutive grouse. But they are great fliers, and men, knowing how they fly across Europe during the spring, catch them by scores of thousands in nets. Our American bobwhite, which we call quail, is a very similar bird, but larger, and it is not migratory. They multiply rapidly, and in Egypt they still, as in the days of Moses, appear in such flocks at night as to almost cover the land.

HOW THE TURKEY BUILDS A MOUND AND DIGS A PIT TO LAY HER EGGS

Everybody knows what the turkey is like, because so many are reared in this country, especially in Norfolk and Cambridgeshire. The birds of Norfolk are black; those of Cambridge are more of a bronze colour, and in that resemble the wild birds of Mexico and North America, from which all our tame turkeys have descended. Turkeys, when in captivity, do not show much desire to fly, but the wild ones do. They fly with great force while they are at it, but come down suddenly when tired. When they find a broad river in the way, many of them, falling weary, drop into the water and swim.

The most curious turkey is the brush-turkey, or talegalla, which is one of a family called mound-birds. It has very long claws, and uses these to build great mounds of decayed vegetable matter. It scratches up all it can find, grasping the substance with its claws and throwing it backwards towards a point behind. Sometimes these mounds reach the size of several cartloads of rubbish. This mass of matter gradually becomes very hot. Then the mother bird digs holes in it, and in each hole lays an egg. The heat hatches the egg, and all that the hen has to do is to wait and see that the chicks are all right when hatched. The funny thing is that the little ones, as soon as they are born, can dry their wings like a moth and fly for safety to the nearest tree. If they could not do this, they would be gobbled up by animals.

THE GUINEA-FOWLS THAT GABBLE, GABBLE, GABBLE AT NIGHT, & THE DUCKS

When we hear a number of birds making a great gabble, gabble, gabble all night, we may be sure that we are in the neighbourhood of guinea-fowls.

The bird was first discovered in Eastern Africa, and from there it has been taken and tamed in many parts of the world. It runs wild very soon, but when looked after is as tame as ordinary poultry.

Of ducks, to which we must now pass, there are a great many varieties. All the tame ones are descended from the common wild duck, or mallard. To see these handsome creatures flying swiftly through the air, one would never think that the great white Aylesbury duck is a member of their family.

Ducks are of two classes—sea-ducks and river-ducks, rarely found together. The sea-ducks as a rule are larger, and some of them, as the mergansers or saw bills, feed on fish and are not good to eat. Most of the salt as well as the fresh water ducks eat plant food, however. This is especially true of the American river-ducks; and it is because they are so fond of the ripe wild celery of our marshes that our canvas-backs, red-heads, teals and others brought to market in the autumn are world-famous delicacies.

DUCKS ARE GREAT TRAVELLERS, BUT FIND THEIR JOURNEYS FULL OF DANGER

Most of the ducks of North America and of Europe are migratory, flying every spring from the tropical countries where they have spent the winter to the far north, where they are accustomed to make their houses and rear their young. They begin to come in February, small flocks appearing along the coast or ascending the valleys of rivers, such as the Mississippi, the Hudson, or the Danube, travelling at night and dropping down into the coast marshes or river shallows in the early morning to feed. This is the time when sportsmen seek to shoot them, building little shelters of earth and reeds in the marshes, where they will not be noticed until the birds are close at hand or lying hidden in low skiffs, which they properly call sneak-boats. The gunners play a further trick of setting afloat near their "blinds" a flock of carefully-painted wooden ducks called "decoys." The wild travellers, seeing their fellows (as they believe) peacefully at rest in a pool, think it safe to drop down beside them, then discover their error too late.

The Mallard and several other of the North American ducks stay in our inland marshes all the summer.

BIRDS THAT LIVE ON INLAND WATERS



Astronomers prophesy that new stars will be discovered, and the new stars do appear. Poets dreamed and sang of black swans, and were laughed at. But when Australia was explored, lo! black swans were there. The bird is heavy and prefers swimming, but when it has to change its quarters it flies with great power.



There are scores of species of geese. Those which we see about the farmyard ponds descend from the grey lagoose. The common geese do not fly, but the wild ones do, far and fast. In quiet places the wild ones feed by day, but when in danger they become purely night-birds, and lie silent and in hiding while the sun is up.



Swans are the most majestic of our inland water-birds. They swim with grace, and they fly with strength and skill. The wild ones come inland for the summer to hatch their young, but then they fly away and no man can follow them, as day and night they wing their way to their distant winter quarters. Their call-note is very loud.

Although its flesh is not much good for food, the eider-duck is one of the most valuable birds. It is a big bird, living in cold climates. The ducks assemble in enormous numbers at their breeding-places, and the mother bird strips her breast of the beautiful down to make the nest warm for her little ones. Men collect this down to make into pillows, quilts, and many other things. If her nest be robbed, the mother bird will again pluck down from herself, and the male bird will add his stock, though this is not so fine as the female's. Each nest yields about a quarter of a pound of the finest down, which helps to keep us warm in our beds on winter nights.

The eider-duck is a sort of goose, but not of the kind which we know in this country. Barnyard geese come from the European grey lag, a strong flying bird, which migrates from place to place. Most of the wild geese which come to this country are visitors from colder climates. They are all splendid fliers; and the skill with which the barnacle - goose avoids men shows that the bird is not nearly so silly as we all pretend to think it. The name which this bird bears is the result of one of men's silly mistakes. They thought that this goose grew out of the common barnacle-shell, so they called it the barnacle-geese.

The most aristocratic member of the family to which the ducks and geese belong is the swan, the most majestic bird that sails the waters. The big park swans are white, but here and there we see black swans, brought from Australia, the land of so many strange animals and birds. For ages poets dreamed of black swans, but nobody believed that there could be such a thing until these birds were found in Australia. The general features of swans do not much vary. We have the white swan, the black swan, and the white swan with a black neck, each a distinct species, yet not greatly differing in form. Some of them are supposed to have no voice, others whistle, while others have a voice like a trumpet.

We ought all to be thankful that it is a crime to kill swans without legal right. They are so beautiful, and do such little harm, that nobody could wish to hurt them except those wretched people who never see a bird without wanting to kill it. Big as they are, swans fly with great power. This accounts for their suddenly appearing where no swans were ever seen before.

A pair of swans dropped down from the skies one day into the horse-pond at a lovely little village in Hertfordshire. The pond is at the side of the main road, over which carts and motors in hundreds pass every day. But there the swans stayed, as if they had always lived there. They built a great nest, and the mother bird laid her eggs and hatched the little ones. Then, when these had grown up, without any warning the birds flew away, and have never been seen there since.

Nobody knows whence they came, nor whither they went. The curious thing is that there are swans in a narrow stream not very far away from this pond. But the strangers never called on the stream swans, and the stream swans never paid a visit to the pond.

All these are among the birds which serve us as food or clothing, even the

swan being eaten, and its soft feathers used for the purposes for which swans-down is famous. But there is one bird which serves man by hunting for him. This is the cormorant, a curious bird with a neck as supple as a swan's, but with a wonderful beak. The Chinese train this bird to fish for them. They take two or three of the birds out on a raft into a river, and the birds, the moment they see a fish, plunge in and catch it.

When they are being trained, the cormorants have a ring fastened round their necks so that they cannot swallow the fish, which they give to their masters. Then they have a good feed themselves. When thoroughly trained, they do not need a ring on their necks, but take the fish to their masters freely.

The next stories of Birds are on page 1625.



The cormorant is the only bird that catches fish for men. It is trained to do this in China, and is also used for this purpose in Japan.



THE BABES IN THE WOOD

ONCE upon a time two children lived in a big house on the borders of a wood.

Their parents, who loved them very dearly, were rich enough to buy them all the lovely things they longed for, and all day long they played in a beautiful garden, learning the songs of the birds and the secrets of the flowers. But one sad day their father and mother left them for a happier home in the skies, and the sister and brother were left alone.

The boy did his best to comfort his little sister; but they were sad days, and, though they did not know it then, days that were sadder still were soon to come.

The children had an uncle whom they had never seen. He lived far away across the seas; but as soon as he learned of the death of his brother, the children's father, he hurried to their home. He knew that now their father was dead the children would have all his money, and the uncle also knew that if he could get rid of the children all this money would be his.

And the more he thought about this money the more he longed for it. And then a dreadful thought came into his head. He determined to kill the little innocent children and take their money.

So he hired two robbers, and paid them to take the children to a lonely spot in the wood and there kill them.

One morning, when the sun shone brightly and all the birds were gay,

CONTINUED FROM 1440

the robbers crept into the garden where the children were playing and took them away.

The robbers were big, rough men, and the children were afraid; but they were told that their uncle had sent them, and they dared not disobey. The men led them out of the garden into the wood, and on and on till they came to a deserted spot. They had come a long way, and the children were glad to rest. They sat down on the trunk of a tree while the robbers moved away and carried on a conversation in a low voice.

But presently they began to quarrel; their voices became loud and angry, and the children heard words that made them tremble with fear.

"I've been paid to kill them, and I shall earn my money," one of them was saying, over and over ag. in.

But the other robber seemed more kindly.

"Why kill them?" he said. "Let us lose them, and perhaps someone may find them and give them shelter."

The little girl crept closer to her brother.

"They want to kill us," she said, in a terrified whisper.

But before the boy could answer the kindly robber came forward and spoke to them.

"Stay here while we go to find food and shelter for the night," he said in a gruff voice.

Then they went away, and the children were left all alone in the wood.



TOO WEARY TO GO ANY FARTHER, THE CHILDREN SAT DOWN UNDER A FRIENDLY OAK

They dare not return to their wicked uncle, and they had no other home ; so they wandered on, hand in hand, hoping to find shelter.

The forest was very beautiful, and for a time they were happy among the wild flowers and ferns ; but soon the sun went down, the birds hushed their songs, and a great stillness came over all. Still the children toiled bravely on, tired, and hungry, and sad.

Presently the trees grew so thickly together that they could scarcely find their way, and at last the darkness of night came on and hid even the trees

from sight. Too weary and frightened to go any farther, the children sat down under a friendly oak, and fell asleep in one another's arms.

The birds of the forest peeped down from their nests above ; the shy squirrels with their long tails glanced wonderingly at them, and the gentle wind shook the leaves so that they fell, making a cloak of crimson and gold to cover them.

And when morning came a beautiful angel flew down and carried them away to their father and mother in the glorious world above.

THE HUNGRY FOX AND THE KITTEN

A VERY hungry fox was prowling one moonlit night about a farmhouse, and he met a little kitten.

"You're not much of a meal for a starving creature," he said. "But in these hard times something is always better than nothing."

"Oh, don't eat me!" said the kitten. "I know where the farmer keeps his cheeses. Come with me and see."

She led him into the farmyard, where there was a deep well with two buckets.

"Now, look in here, and you will see the cheeses," she said.

The fox peered down the well, and saw the moon reflected in the water.

"This is the way down," said the

kitten, jumping into the top bucket. Round and round rattled the rope-wheel, and down went the kitten into the water. Happily, she had gone down before, and she knew what to do, and, getting out of the bucket, she clung on to the rope just above the water.

"Can't you bring up one of the cheeses?" said the fox.

"No, they are too heavy," said the kitten. "You must come down."

Now, the two buckets were connected, so that when one went down the other came up. As the fox was much heavier than his little companion, his bucket went down and the water drowned him, while the kitten came up and escaped.

THE PROUD KING OF KAMERA

THE negro King of Kamera, in Africa, was a proud, stern man, and his men feared him, and instantly carried out his slightest wishes. But one day, when he was boasting that all men were his servants, a wise old negro, called Boukabar, reproached him, saying:

"All men are servants of one another."

"So I am your servant, am I?" said the king, in great anger. "Then prove it. Force me to work for you before sunset, and I will give you a hundred cows. Fail, and I will kill you, and so show you that I am your master."

"Very well," said Boukabar.

Being a very old man, he had to use a stick in walking, and just as he took it up to go out, a beggar came to the door.

"Permit me," said Boukabar, "to give this poor man something to eat."

Taking some food in both hands, he tottered past the king, and his stick slipped from under his arm and got entangled in his dress, and nearly tripped him up. And he cried to the king:

"Please pick up the stick, or I shall fall." The king picked it up without thinking, and Boukabar then laughed merrily, and exclaimed: "You see, all good men are servants of one another. I am waiting on the beggar, and you are waiting on me. But I do not want the cows. Give them to this poor man."

The king did so, and took Boukabar as his chief counsellor, and Boukabar showed him how to rule his people well.

LOVE LAUGHS AT LOCKSMITHS

THIS was the device which the handsome young Marquis of Hautmont engraved on his shield when he came to Paris. Being as bold as he was handsome, he began to make love to Princess Marguerite, the king's daughter, and the king was annoyed at his boldness.

"They are loud words which you have taken for your device," said he, "but are they true? I will lock the princess up in a tower. If you can enter it within a month, you can marry her. If you fail, you must lose your life."

The marquis pretended to be discomfited. But he secretly ordered some woodcarvers to make a great hollow wooden nightingale. When the bird was finished and painted, the

marquis got inside and played beautiful airs on a flute, while his servant drew it about the streets. Everybody began to talk about the mechanical nightingale; the king came to see it, and Princess Marguerite asked for it to be brought to her. The king, thinking that the music was produced by machinery, had the bird carried into the tower, and the marquis then jumped out and kissed the princess's hand, saying:

"Love laughs at locksmiths, you see, sire." And the king was forced to acknowledge that this was true; and as he saw that the marquis and the princess were in love with one another, he allowed them to marry, and presented them with a really royal dowry.

THE KING OF THE GOLDEN RIVER



This is the second chapter of the fairy story by John Ruskin, which began on page 1433

SOUTH-WEST WIND LEAVES THE VALLEY

SOUTH-WEST WIND, ESQUIRE, was as good as his word. He entered the Treasure Valley no more; and, what was worse, he had so much influence with his relations, the West Winds in general, and used it so effectually, that they all adopted a similar line of conduct.

So no rain fell in the valley from one year's end to another. Though everything remained green and flourishing in the plains below, the inheritance of the three brothers was a desert. All their money was gone, and they had nothing left but some curious old-fashioned pieces of gold plate.

"Suppose we turn goldsmiths?" said Schwartz to Hans. "It is a good knave's trade. We can put a great deal of copper into the gold without anyone's finding it out."

The thought was agreed to be a very good one; they hired a furnace, and turned goldsmiths. But two slight circumstances affected their trade—the first, that people did not approve of the copped gold; the second, that the two elder brothers, whenever they had sold anything, used to leave little Gluck to mind the furnace, and go and drink out the money in the ale-house next door.

So they melted all their gold without making money enough to buy more, and were at last reduced to one large drinking-mug, which an uncle of his had given to little Gluck, and which he was very fond of, and would not have parted with for the world, though he never drank anything out of it but milk-and-water. The mug was a very odd mug to look at. The handle was

formed of two wreaths of flowing golden hair, so finely spun that it looked more like silk than metal; and these wreaths descended into, and mixed with, a beard and whiskers of the same exquisite workmanship, which surrounded and decorated a very fierce little face, of the reddest gold imaginable, right in the front of the mug, with a pair of eyes in it which seemed to command its whole circumference. When it came to the mug's turn to be made into spoons, it half broke poor little Gluck's heart; but the brothers only laughed at him, tossed the mug into the melting-pot, and staggered out to the ale-house, leaving him to pour the gold into bars when it was all ready.

When they were gone, Gluck took a farewell look at his old friend in the melting-pot. He sauntered to the window, and saw the rocks of the mountain-tops all crimson and purple with the sunset; and the river, brighter than all, fell, in a waving column of pure gold, from precipice to precipice, with the double arch of a broad purple rainbow stretched across it.

"Ah," said Gluck aloud, after he had looked at it for a while, "if that river were really all gold, what a nice thing it would be!"

"No, it wouldn't, Gluck," said a clear voice, close at his ear.

"Bless me, what's that?" exclaimed Gluck, jumping up.

There was nobody there.

He looked into all the corners and cupboards, and then began turning round and round as fast as he could in the middle of the room, thinking there was somebody behind him,

when the same voice struck again on his ear.

It was singing now very merrily, "Lala-lira-la"; no words, only a soft melody, like a kettle on the boil. All at once it struck Gluck that it sounded louder near the furnace. He ran to the opening, and looked in. Yes, he saw right; it seemed to be coming, not only out of the furnace, but out of the pot. He uncovered it, and ran back in a great fright, for the pot was certainly singing! He stood in the farthest corner of the room, with his hands up and his mouth open, for a minute or two, when the singing stopped, and the voice became clear.

"Hallo!" said the voice.

Gluck made no answer.

"Hallo! Gluck, my boy," said the pot again.

Gluck summoned all his energies, walked straight up to the crucible, drew it out of the furnace, and looked in. The gold was all melted, and its surface as smooth and polished as a river; but instead of reflecting little Gluck's head as he looked in, he saw, meeting his glance from beneath the gold, the red nose and sharp eyes of his old friend the mug, a thousand times redder and sharper than ever he had seen them in his life.

"Come, Gluck, my boy," said the voice out of the pot again, "I'm all right; pour me out."

But Gluck was too much astonished to do anything of the kind.

"Pour me out, I say," said the voice rather gruffly.

Still Gluck couldn't move.

"Will you pour me out?" said the voice passionately. "I'm too hot."

By a violent effort Gluck recovered the use of his limbs, took hold of the crucible, and sloped it so as to pour out the gold. But instead of a liquid stream, there came out, first, a pair of pretty little yellow legs, then some coat-tails, then a pair of arms, and, finally, the well-known head of his friend the mug; all which articles, uniting as they rolled out, stood up energetically on the floor, in the shape of a little golden dwarf, about a foot and a half high.

"That's right!" said the dwarf, stretching out first his legs, and then his arms, and then shaking his head up

and down and as far round as it would go for five minutes without stopping, apparently with the view of ascertaining if he were quite correctly put together, while Gluck stood contemplating him in speechless amazement.

He was dressed in a slashed doublet of spun gold, so fine in its texture that the colours gleamed over it as if on a surface of mother-of-pearl; and over this brilliant doublet his hair and beard fell full half-way to the ground in waving curls.

The dwarf turned his small, sharp eyes full on Gluck, and stared at him deliberately for a minute or two. This gave time for Gluck to collect his thoughts a little, and, seeing no great reason to view his visitor with dread, he ventured on a question.

"Pray, sir," said Gluck, "were you my mug?"

On which the little man turned sharply round, walked straight up to Gluck, and drew himself up to his full height.

"I am the King of what you mortals call the Golden River. The shape you saw me in was owing to the malice of a stronger king, from whose enchantments you have freed me. What I have seen of you and your conduct to your wicked brothers renders me willing to serve you; therefore attend to what I tell you. Whoever shall climb to the top of that mountain from which you see the Golden River issue, and shall cast into the stream at its source three drops of holy water, for him, and for him only, the river shall turn to gold. But no one failing in his first can succeed in a second attempt; and if anyone shall cast unholy water into the river it will overwhelm him, and he will become a black stone."

So saying, the King of the Golden River turned away and deliberately walked into the centre of the hottest flame of the furnace. His figure became red, white, transparent, dazzling, a blaze of intense light—rose, trembled, and disappeared. The King of the Golden River had evaporated.

"Oh!" cried poor Gluck, running to look up the chimney after him. "Oh, dear, dear, dear me! My mug! my mug! my mug!"

CHAPTER III.

THE QUEST OF HANS, AND THE BLACK STONE

The King of the Golden River had hardly made his extraordinary exit before Hans and Schwartz came roaring into the house, very savagely drunk.

The discovery of the total loss of their last piece of plate had the effect of sobering them just enough to enable them to stand over Gluck beating him very steadily for a quarter of an hour ; at the expiration of which period they dropped into a couple of chairs, and requested to know what he had got to say for himself. Gluck told them his story, of which, of course, they did not believe a word. They beat him again till their arms were tired, and staggered to bed. In the morning, however, the two brothers, after wrangling a long time on the knotty question which of them should try his fortune first, drew their swords and began fighting. The noise of the fray alarmed the neighbours, who sent for the constable.

Hans, on hearing this, contrived to escape, and hid himself ; but Schwartz was taken before the magistrate, fined for breaking the peace, and, having drunk out his last penny the evening before, was thrown into prison till he should pay.

When Hans heard this he was much delighted, and determined to set out immediately for the Golden River. How to get the holy water was the question. He went to the priest, but the priest could not give any holy water to so abandoned a character. So Hans stole a cupful, and returned home in triumph.

Next morning he got up before the sun rose, put the holy water into a strong flask, and two bottles of wine and some meat in a basket, slung them over his back, took his staff in his hand, and set off for the mountains.

It was, indeed, a morning that might have made anyone happy, even with no Golden River to seek for. Level lines of dewy mist lay stretched along the valley, out of which rose the massy mountains.

The Golden River was now nearly in shadow ; all but the uppermost jets of spray, which rose like slow smoke above the undulating line of the

cataract, and floated away in feeble wreaths upon the morning wind.

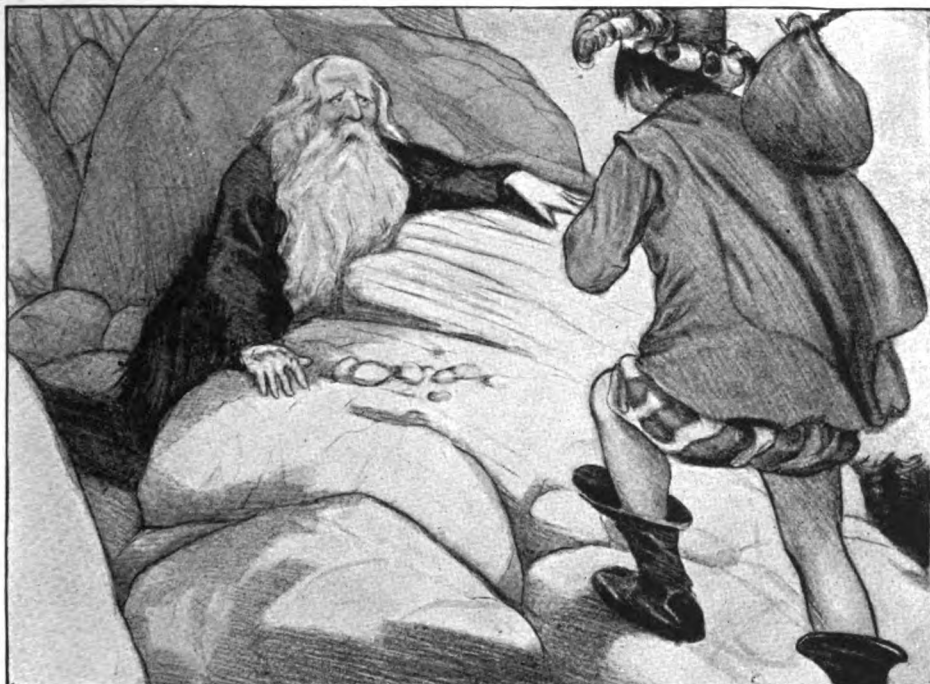
On this object, and on this alone, Hans' eyes and thoughts were fixed ; forgetting the distance he had to traverse, he set off at an imprudent rate of walking, which greatly exhausted him before he had scaled the first range of the green and low hills. He was, moreover, surprised, on surmounting them, to find that a large glacier, of whose existence he had been absolutely ignorant, lay between him and the source of the Golden River.

He entered on it with the boldness of a practised mountaineer ; yet he thought he had never traversed so strange or so dangerous a glacier in his life. The ice was excessively slippery, and out of all its chasms came wild sounds of gushing water. The ice crashed and yawned into fresh chasms at his feet, and tottering spires nodded around him and fell thundering across his path ; and it was with terror that he leaped the last chasm, and flung himself, exhausted and shuddering, on the firm turf of the mountain.

His way now lay straight up a ridge of bare red rocks, without a blade of grass to ease the foot, or a projecting angle to afford an inch of shade from the south sun. It was past noon, and the rays beat intensely upon the steep path, while the whole atmosphere was motionless and penetrated with heat. Intense thirst was soon added to the bodily fatigue with which Hans was now afflicted ; glance after glance he cast on the flask of water which hung at his belt.

"Three drops are enough," at last thought he ; "I may, at least, cool my lips with it."

He opened the flask, and was raising it to his lips when his eye fell on an object lying on the rock beside him ; he thought it moved. It was a small dog, apparently in the last agony of death from thirst. Its tongue was out, its jaws dry, and a swarm of black ants were crawling about its lips and throat. Its eye moved to the bottle which Hans held in his hand. He raised it, drank, spurned the animal with his foot, and passed on. And he did not know how it was, but he thought that a strange shadow had suddenly come across the blue sky.



HANS SAW A GREY-HAIRED OLD MAN EXTENDED ON THE ROCKS. "WATER!" HE CRIED FEEBLY

The path became steeper and more rugged every moment; and the high hill air, instead of refreshing him, seemed to throw him into a fever. The noise of the hill cataracts sounded like mockery in his ears; they were all distant, and his thirst increased every moment.

Another hour passed, and he again looked down to the flask at his side; it was half empty; but there was much more than three drops in it. He stopped to open it, and again, as he did so, something moved in the path above him. It was a fair child, stretched nearly lifeless on the rock, its breast heaving with thirst, its eyes closed, and its lips parched and burning. Hans eyed it deliberately, drank, and passed on. And a dark, grey cloud came over the sun, and long, snake-like shadows crept up along the mountain sides.

Hans struggled on. The sun was sinking, but its descent seemed to bring no coolness; the leaden weight of the dead air pressed upon his brow and heart, but the goal was now near. He saw the cataract of the Golden River springing down from the hillside, scarcely five hundred feet above him. He paused for a moment to breathe, and sprang on to complete his task.

At this instant a faint cry fell on his ear. He turned, and saw a grey-haired old man extended on the rocks. His eyes were sunk, his features deadly pale, and gathered into an expression of despair.

"Water!" He stretched his arms to Hans, and cried feebly: "Water! I am dying!"

"I have none," replied Hans. "Thou hast had thy share of life."

He strode over the prostrate body, and darted on. And a flash of blue lightning rose out of the East, shaped like a sword; it shook thrice over the whole heaven, and left it dark with one heavy, impenetrable shade. The sun was setting; it plunged towards the horizon like a red-hot ball.

The roar of the Golden River rose on Hans' ear. He stood at the brink of the chasm through which it ran. Its waves were filled with the red glory of the sunset; they shook their crests like tongues of fire, and flashes of bloody light gleamed along their foam. Their sound came mightier and mightier on his senses; his brain grew giddy with the prolonged thunder. Shuddering, he drew the flask from his girdle, and hurled it into the centre of the torrent.

As he did so, an icy chill shot through his limbs; he staggered, shrieked, and fell. The waters closed over his cry. And the moaning of the river rose wildly into the night, as it gushed over THE BLACK STONE.

CHAPTER IV.

THE QUEST OF SCHWARTZ AND WHAT BEFELL HIM.

Poor little Gluck waited very anxiously alone in the house for Hans' return. Finding he did not come back, he was terribly frightened, and went

prison. Then Schwartz was quite pleased, and said he should have some of the gold of the river. But Gluck only begged he would go and see what had become of Hans.

Now when Schwartz had heard that Hans had stolen the holy water, he thought to himself that such a proceeding might not be considered altogether correct by the King of the Golden River, and determined to manage matters better. So he took some more of Gluck's money, and went to a bad priest, who gave him some holy water very



LITTLE GLUCK, FRIGHTENED, WENT AND TOLD SCHWARTZ IN PRISON ALL THAT HAD HAPPENED

and told Schwartz in the prison all that had happened. Schwartz was pleased, and said that Hans must certainly have been turned into a black stone, and he should have all the gold to himself.

But Gluck was very sorry, and cried all night. When he got up in the morning, there was no bread in the house, nor any money; so Gluck went and hired himself to another goldsmith, and he worked so hard, and so neatly, and so long every day, that he soon got money enough together to pay his brother's fine, and he gave it all to Schwartz, and Schwartz got out of

readily for it. Then Schwartz was sure it was all quite right. So Schwartz got up early in the morning before the sun rose, and took some bread and wine in a basket, and put his holy water in a flask, and set off for the mountains.

Like his brother, he was much surprised at the sight of the glacier, and had great difficulty in crossing it even after leaving his basket behind him. The day was cloudless, but not bright; there was a heavy purple haze hanging over the sky, and the hills looked lowering and gloomy. And as Schwartz climbed the steep rock path, the thirst came

CHAPTER V.

GLUCK REACHES THE GOLDEN RIVER.

upon him until he lifted his flask to his lips to drink. Then he saw the fair child lying near him on the rocks, and it cried to him, and moaned for water.

"Water, indeed!" said Schwartz. "I haven't half enough for myself," and passed on. And as he went he thought the sunbeams grew more dim, and he saw a low bank of black cloud rising out of the West; and, when he had climbed for another hour, the thirst overcame him again, and he would have drunk. Then he saw the old man lying before him on the path, and heard him cry out for water.

"Water, indeed!" said Schwartz. "I haven't half enough for myself." And on he went.

Then, again, the light seemed to fade from before his eyes, and he looked up, and, behold, a mist, of the colour of blood, had come over the sun; and the bank of black cloud had risen very high, and its edges were tossing and tumbling like the waves of the angry sea. And they cast long shadows, which flickered over Schwartz's path.

A sudden horror came over Schwartz, he knew not why; but the thirst for gold prevailed over his fear, and he rushed on. And when Schwartz stood by the brink of the Golden River, its waves were black like thunder-clouds, but their foam was like fire; and the roar of the waters below and the thunder above met as he cast the flask into the stream.

And, as he did so, the lightning glared in his eyes, and the earth gave way beneath him, and the waters closed over his cry. And the moaning of the river rose wildly into the night, as it gushed over the

TWO BLACK STONES.

When Gluck found that Schwartz did not come back, he was very sorry, and did not know what to do. He had no money, and was obliged to go and hire himself again to the goldsmith, who worked him very hard, and gave him very little money.

So, after a month or two, Gluck grew tired, and made up his mind to go and try his fortune with the Golden River.

"The little king looked very kind," thought he. "I don't think he will turn me into a black stone."

So he went to the priest, and the priest gave him some holy water as soon as he asked for it. Then Gluck took some bread in his basket, and the bottle of water, and set off very early for the mountains.

If the glacier had occasioned a great deal of fatigue to his brothers, it was twenty times worse for him, who was neither so strong nor so practised on the mountains. He had several very bad falls, lost his basket and bread, and was very much frightened at the strange noises under the ice. He lay a long time to rest

on the grass after he had got over, and began to climb the hill just in the hottest part of the day. When he had climbed for an hour, he got dreadfully thirsty, and was going to drink like his brothers when he saw an old man coming down the path above him, looking very feeble, and leaning on a staff.

"My son," said the old man, "I am faint with thirst, give me some of that water."

Then Gluck looked at him, and when he saw that he was pale and weary, he



THE PRIEST GIVES GLUCK SOME HOLY WATER

gave him the water; "Only pray don't drink it all!" said Gluck. But the old man drank a great deal, and gave him back the bottle two-thirds empty. Then he bade him good speed, and Gluck went on again merrily. And the path became easier to his feet, and two or three blades of grass appeared upon it, and some grasshoppers began singing on the bank beside it; and Gluck thought he had never heard such merry singing.

Then he went on for another hour, and the thirst increased on him so that

all kinds of sweet flowers growing on the rocks, bright green moss, with pale pink starry flowers, and soft belled gentians, more blue than the sky at its deepest, and pure white transparent lilies. And crimson and purple butterflies darted hither and thither, and the sky sent down such a pure light that Gluck had never felt so happy in his life.

Yet, when he had climbed for another hour, his thirst became intolerable again, and when he looked at his bottle he saw that there were only five or six drops left in it, and he could not venture



GLUCK PUT THE BOTTLE TO THE CHILD'S LIPS AND IT DRANK IT ALL BUT A FEW DROPS

he thought he should be forced to drink. But, as he raised the flask, he saw a little child lying panting by the roadside, and it cried out piteously for water. Then Gluck struggled with himself, and determined to bear the thirst a little longer; and he put the bottle to the child's lips, and it drank it all but a few drops.

Then it smiled on him, and got up, and ran down the hill; and Gluck looked after it till it became as small as a little star, and then turned and began climbing again. And then there were

to drink. And, as he was hanging the flask to his belt again, he saw a little dog lying on the rocks gasping for breath—just as Hans had seen it on the day of his ascent. And Gluck stopped and looked at it, and then at the Golden River, not five hundred yards above him; and he thought of the dwarf's words, "that no one could succeed except in his first attempt"; and he tried to pass the dog, but it whined piteously, and Gluck stopped again.

"Poor beastie," said Gluck, "it'll be dead when I come down again if I

THE DWARF FADES AWAY IN THE MIST



As he spoke, the figure of the dwarf became indistinct. The playing colours of his robe formed themselves into a mist of dewy light : he stood for an instant veiled with them as with the belt of a broad rainbow. The colours grew faint, the mist rose into the air ; the monarch had evaporated. Then Gluck cast the three drops into the stream.

don't help it." Then he looked closer and closer at it, and its eye turned on him so mournfully that he could not stand it. "Confound the King and his gold, too!" said Gluck; and he opened his flask, and poured all the water into the dog's mouth.

The dog sprang up and stood on its hind legs. Its tail disappeared; its ears became long, longer, silky golden; its nose became very red; its eyes became very twinkling. In three seconds the dog was gone, and before Gluck stood his old acquaintance the King of the Golden River.

"Thank you," said the monarch; "but don't be frightened, it's all right." For Gluck showed manifest symptoms of consternation at this unlooked-for reply to his last observation. "Why didn't you come before," continued the dwarf, "instead of sending me those rascally brothers of yours for me to have the trouble of turning into stones? Very hard stones they make, too!"

"Oh, dear me!" said Gluck, "have you really been so cruel?"

"Cruel!" said the dwarf. "They poured unholy water into my stream; do you suppose I'm going to allow that?"

"Why," said Gluck, "I am sure, sir—your Majesty, I mean—they got the water out of the church font."

"Very probably," replied the dwarf; "but," and his countenance grew stern as he spoke, "the water which has been refused to the cry of the weary and dying is unholy, though it had been blessed by every saint in heaven; and the water which is found in the vessel of mercy is holy, though it had been defiled with corpses."

So saying, the dwarf stooped and plucked a lily that grew at his feet. On its white leaves there hung three drops of clear dew. And the dwarf shook them into the flask which Gluck held in his hand. "Cast these into the river," he said, "and descend on the other side of the mountains into the Treasure Valley. And so good speed!"

As he spoke, the figure of the dwarf became indistinct. The playing colours of his robe formed themselves into a mist of dewy light: he stood for an instant veiled with them as with the belt of a broad rainbow. The colours

grew faint, the mist rose into the air; the monarch had evaporated.

And Gluck climbed to the brink of the Golden River, and its waves were as clear as crystal and as brilliant as the sun. And, when he cast the three drops of dew into the stream, there opened, where they fell, a small circular whirlpool, into which the waters descended with a musical noise.

Gluck stood watching it for some time, very much disappointed, because not only the river was not turned into gold, but its waters seemed much diminished in quantity. Yet he obeyed his friend the dwarf, and descended the other side of the mountains, towards the Treasure Valley; and, as he went, he thought he heard the noise of water working its way under the ground. And, when he came in sight of the Treasure Valley, behold, a river, like the Golden River, was springing from a new cleft of the rocks above it, and was flowing in innumerable streams among the dry heaps of red sand.

And as Gluck gazed, fresh grass sprang beside the new streams, and creeping plants grew, and climbed among the moistening soil. Young flowers opened suddenly along the river sides, as stars leap out when twilight is deepening, and thickets of myrtle and tendrils of vine cast lengthening shadows over the valley as they grew. And thus the Treasure Valley became a garden again, and the inheritance, which had been lost by cruelty, was regained by love.

And Gluck went and dwelt in the valley, and the poor were never driven from his door; so that his barns became full of corn, and his house of treasure. And, for him, the river had, according to the dwarf's promise, become a River of Gold.

And, to this day, the inhabitants of the valley point out the place where the three drops of holy dew were cast into the stream, and trace the course of the Golden River under the ground, until it emerges in the Treasure Valley.

And at the top of the cataract of the Golden River are still to be seen two black stones, round which the waters howl mournfully every day at sunset; and these stones are still called by the people of the valley

THE BLACK BROTHERS.

The next Stories begin on page 1671.



The things inside a watch

THE STORY OF THE CLOCK

ALFRED THE GREAT, one of the noblest kings who ever ruled over England, never saw a clock. He used to allow himself eight hours for work, eight hours for pleasure, and eight hours for sleep. When he wanted to fix the time like this, he had to have candles made which took a certain time to burn away, and so told him how the hours were passing.

Even that was better than many men were able to do. They knew how long a year was, because it takes the earth a year to go round the sun. They knew how long a month was, because it takes a month for the moon to go round the earth. They knew how long the day and the night were, because it takes just a day and a night, all but a few odd minutes, for the earth to turn once round. But all sorts of things had to be used before clocks were made to tell how an hour passed, and some of these ways of telling time are shown in pictures in the following pages.

But there is nothing so simple and so good as a clock, which tells us the time at a glance as soon as we have learned to understand it.

There are many different sorts of clocks. Some will go for years, once they have been wound up. Others will go for eight days; others need winding up every day. But, no matter how often they need winding up, and no matter how they are made to go, the thing they have to do is the

CONTINUED FROM 1418

same in all. A certain number of wheels have to be made to go round so regularly that it will always take them a certain time to do their work. When you wind up what is called a grandfather's clock, you wind strings on to a sort of barrel. At the end of the strings heavy weights are fixed. These weights hang down and are always pulling. The pulling makes the wheels go round, just as the pulling of a horse makes the cart go. The wheels have cogs, or teeth, and fit into the cogs of other wheels, and all have to go round at the same time, though not all as fast as one another. Some wheels have a lot of teeth, others have not so many. So while one wheel turns round in sixty seconds, or one minute, another wheel takes sixty minutes, or one hour, in which to turn round. All this twisting and turning is simply to make the hands work round and round over the face.

There are many parts always at work. There is the pendulum swinging, and there is the part which prevents the clock from doing its work too quickly or too slowly. If the clock goes too quickly, or gains time, as we say, we unwind a little screw at the bottom of the pendulum. This lets the weight at the end of the pendulum slip down a little, and causes the pendulum to swing more slowly. If the clock loses time, we wind the screw up a little. This makes the pendulum shorter, and causes it to swing a little

faster. Some clocks have no pendulum. They work with a spring. Then, instead of altering the pendulum, we have to move a little pointer. If we push it to the right, that makes the spring tighter, and makes the watch or clock go a little faster. If we push the pointer to the left, it makes the spring looser, and so causes the watch to go more slowly. But whether it be a clock with heavy weights, or a clock with a big strong spring, or ever so tiny a watch with a little spring just like a thread of steel, the work done is always the same. The long hand has to hop, little by little, round the face of the clock, from minute to minute. The hour hand goes from hour to hour.

THE CLOCK THAT RINGS A BELL TO TELL TIME IN THE DARK

Some clocks not only tell the time with their hands, but strike the hour. When the long minute hand points to the figure twelve, and the short hour hand points to one, a little hammer at the back of the clock gives one blow on a bell which is fixed at the top of the clock. This tells us that it is one o'clock, without our having to look. Some clocks strike as each quarter of an hour passes; others play a tune at the end of each hour.

Clocks and watches can be made to do very wonderful things. One watch, called the repeater watch, can be made to tell you what time it is even when you are in the dark. You have simply to press a knob, and a little bell rings out the number of the hour, and the number of the quarter-hours that have passed since that hour was reached.

Then there is the alarm clock, which rings a bell at the hour for which you have set it.

THE CLOCK THAT SAVED A MAN'S LIFE BY MAKING A MISTAKE

So through day and night, week after week, year after year, the faithful clock goes on telling us the time. Some clocks last hundreds of years. The editor of this book has heard a tune played in Holland by a clock which was ticking when Napoleon was alive, and another in an old church in England which has lasted more than three hundred years. Both these clocks still tell the time as correctly as if they had been made only a year ago.

But nothing is perfect in this world,

not even a clock. Once a man was saved from a cruel death by a mistake made by a clock. A sentinel, who was supposed to keep awake all night at the king's palace, was said to have fallen asleep while on duty, at twelve o'clock at night. Now, if they had been able to prove that he had been asleep, that poor soldier would have been shot, so he was very anxious to show that he was awake.

"I can prove that I was not asleep," the man said. "I heard Great Tom of Westminster strike thirteen."

At first they thought that this was a stupid story, because clocks do not strike more than twelve; but when inquiries were made it was found that what the man said was true. The clock had got something the matter with it that night, and it struck thirteen instead of twelve. That little mistake of the clock saved the soldier's life.

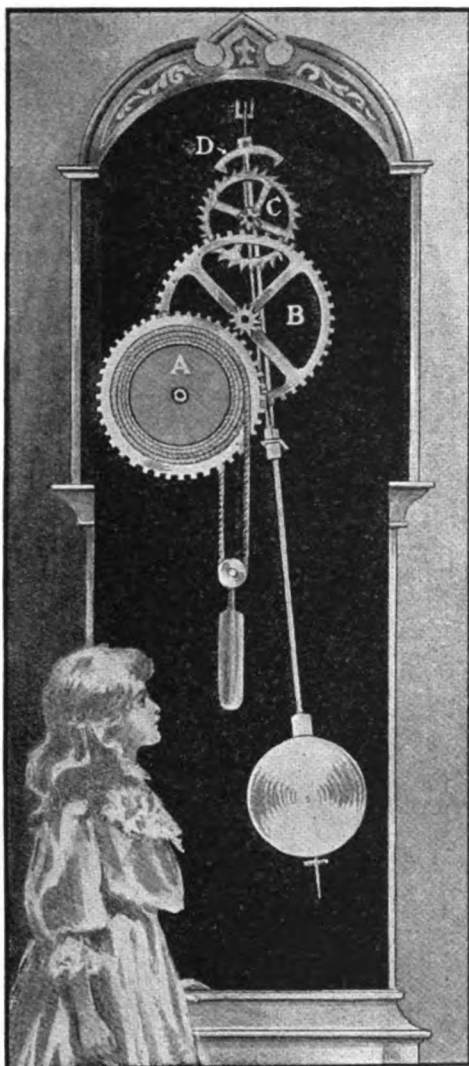
Great Tom of Westminster was the clock which Edward I. put up over the old Houses of Parliament. For 400 years it rang out the hours of day and night. It has gone now, and since 1858 Big Ben has reigned in its stead.

BIG BEN TELEGRAPHS HIS TIME TO GREENWICH TWICE A DAY

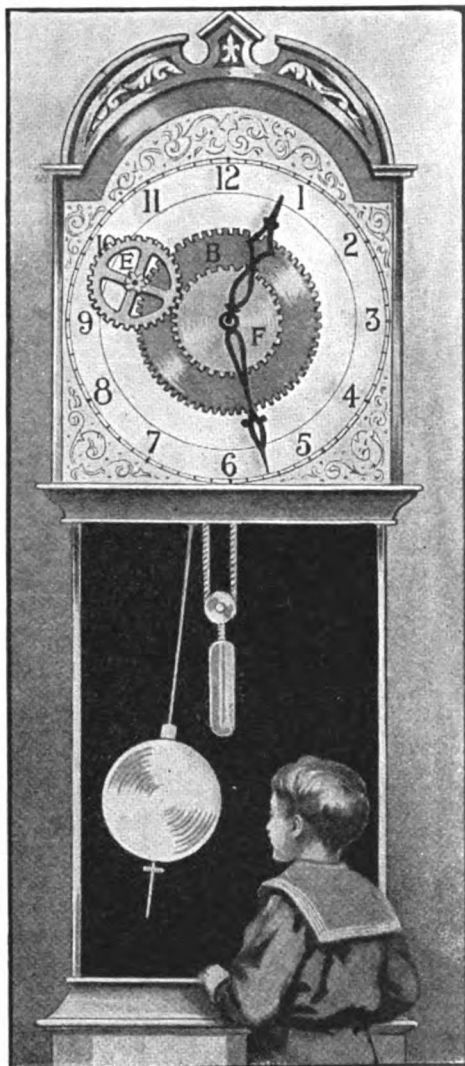
Big Ben has had a smooth career for many years, but it was not always so. The first Big Ben weighed 16 tons. Soon after it had been hung in its place, it cracked. The hammer was too heavy for it; the jarring had smashed it. That was taken down and the new one made, two years after the other.

The same thing happened again. The second Big Ben cracked, and for a long time the bell hung silent. At last they twisted Big Ben round in his tower, so as to make the hammer strike a part which had not been cracked. Then they got a smaller hammer, and for the last thirty years Big Ben has been ringing old days out and new days in, none the worse for the split in his side. The clock and its bells cost \$110,000. Twice a day its works set going a machine which telegraphs Big Ben's time to Greenwich to see that it corresponds with the time there. So that day and night Big Ben is right. It can be seen from far and near when the sun is up, and at night the lights behind its face shine through the dials to tell the dark city what the hour is.

HOW THE WHEELS GO ROUND

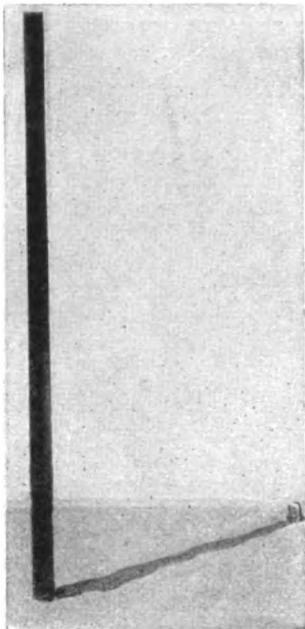


This picture of the inside of a clock shows us how the wheels go round. It is not the pendulum that makes the clock go; it is either a weight or a spring. In this grandfather's clock it is a weight. The weight is on a cord which passes round a broad wheel, called a barrel, marked A in the picture. The heavy weight pulls the cord downwards, and the cord, being wound round the barrel, pulls the barrel round. The edge of this barrel has teeth which work into the teeth of another wheel, marked B, so that both wheels go round. This second wheel causes the top wheel, marked C, to go round, and so all the wheels are set to work. But if that were all, the wheels would run round too quickly, and they must be made to run slowly and regularly. At the top is a curved piece of metal with a catch at each end; it is called the escapement, and is marked D. This swings to and fro, and every time it swings, it catches the top wheel and prevents it from going round more than one tooth.

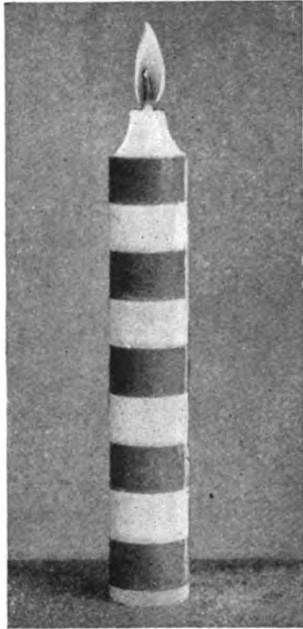


This picture shows how the wheels make the hands go round. The three wheels shown in front of the clock, marked B, E, and F, are really behind the face. B, E, and F are necessary for the hands. Wheel F goes round once every hour, and as the minute hand is fixed to it, the wheel carries the minute hand round with it. Now wheel F touches wheel E with its edge, making it go round also. E is a double wheel, having near the centre a small wheel fixed to it with only six teeth; it is really on the other side of wheel E, but is shown in the picture in front for clearness. Each tooth in it fits into a tooth in wheel B, thus making that wheel go round. As wheel E goes round once in an hour, the six teeth in its centre carry round one-twelfth of wheel B, which has seventy-two teeth. The hour hand is fixed to wheel B, so while F is going once round, it makes wheel E drive B one-twelfth of its journey. Thus wheel F, with the minute hand, turns twelve times while wheel B, with the hour hand, turns once.

HOW MEN FIRST TOLD THE TIME



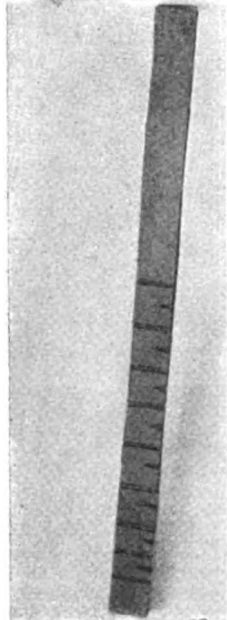
This was one of the first ways in which men told the time, fixing a stick upright in the ground and marking the spot reached by the shadow. This moves round the stick, becoming shorter before noon and longer after.



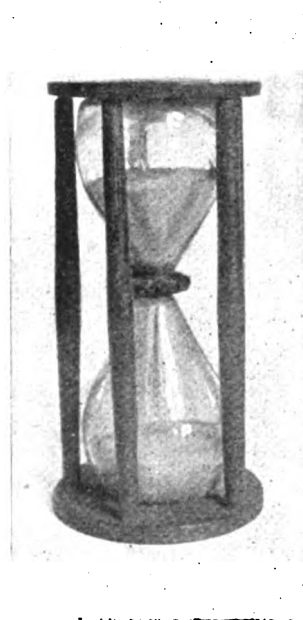
At night men marked a candle in equal sections in black and white, so that each section was burned in a given time. Alfred the Great is said to have invented this way of measuring the passing of time.



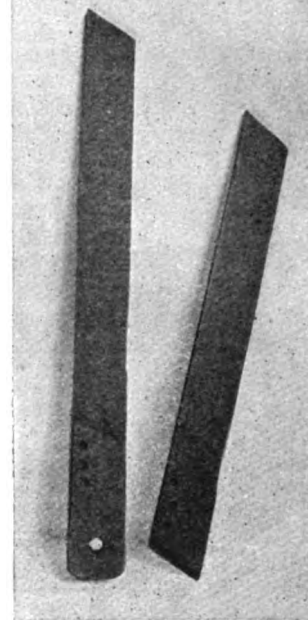
Here is a simpler method of telling the time by night. A hemp rope is knotted in regular spaces, and set light to at the bottom, smouldering slowly and regularly. In Korea people still tell time in this way.



Here is a time-recorder. Every time a section of rope or candle is burnt through, or an hour-glass turned, the owner cuts a notch on a stick to mark the hours of vigil passed.



This is an hour-glass, like an egg-boiler used in kitchens. One end is filled with sand, which pours through a small hole into the bottom bulb. It was once used to measure sermons!



When a master and man wished to keep a record of time for wages, two sticks were used. The servant brought his part of the stick, and the farmer compared it with his own.

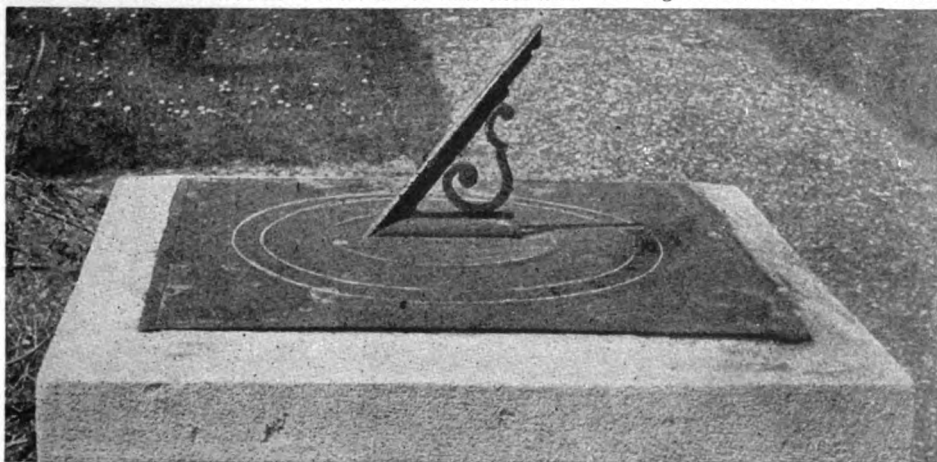
HOW MEN MEASURED TIME BY THE SUN



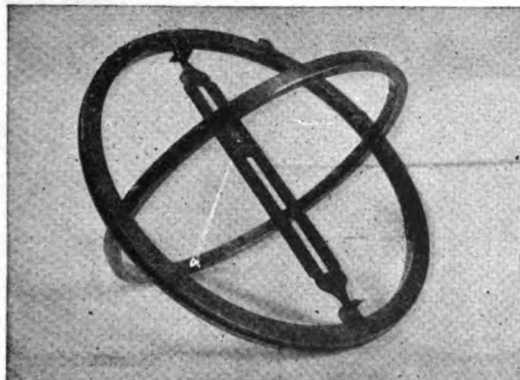
Time was measured for ages and ages by placing a small dish or a round basin in water and boring a hole in the bottom of it, the water flowing in, and gradually sinking it. This would always happen in the same period of time, so that men knew the time when the dish or water-clock sank.



This is a tiny rushlight holder. A rushlight was used before candles were made. It burns regularly, and was used by the poor for a long time after candles were invented.



There are very few people who have not seen a sun-dial, either on a house, or on a pedestal in a park. The dial is marked, and the time is told by the shade of the pointer falling on the different numbers. This is a toy in which the older children will be interested, and the article on page 1285 explains how to make one.

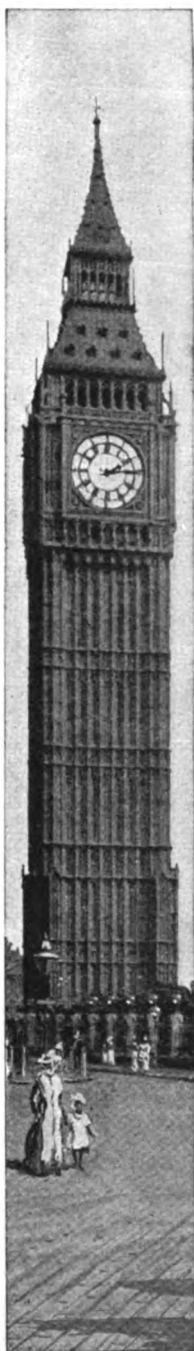


This is a kind of movable sun-dial, which can be held up so that the sunlight shines through a tiny hole in the straight piece of metal, and lights up one of the figures engraved inside of the circle, which is placed at a right angle to the straight piece.



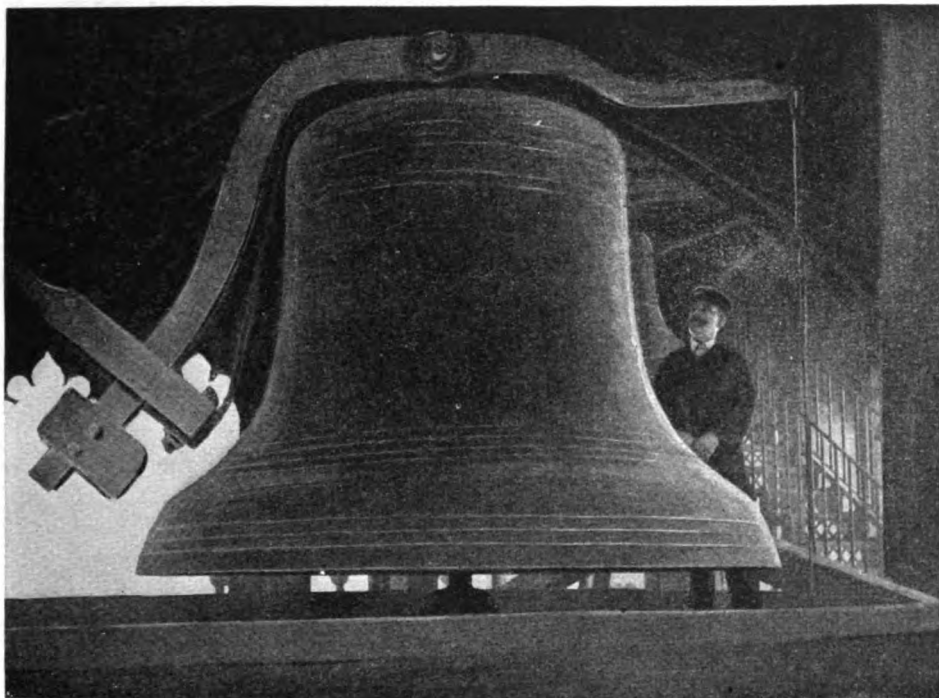
This is a primitive watch. It was always held in one position, and the sun, shining through the little hole, fell upon one of the numbers engraved on the inside of the circle, as shown here.

BEHIND THE GREAT FACE OF BIG BEN

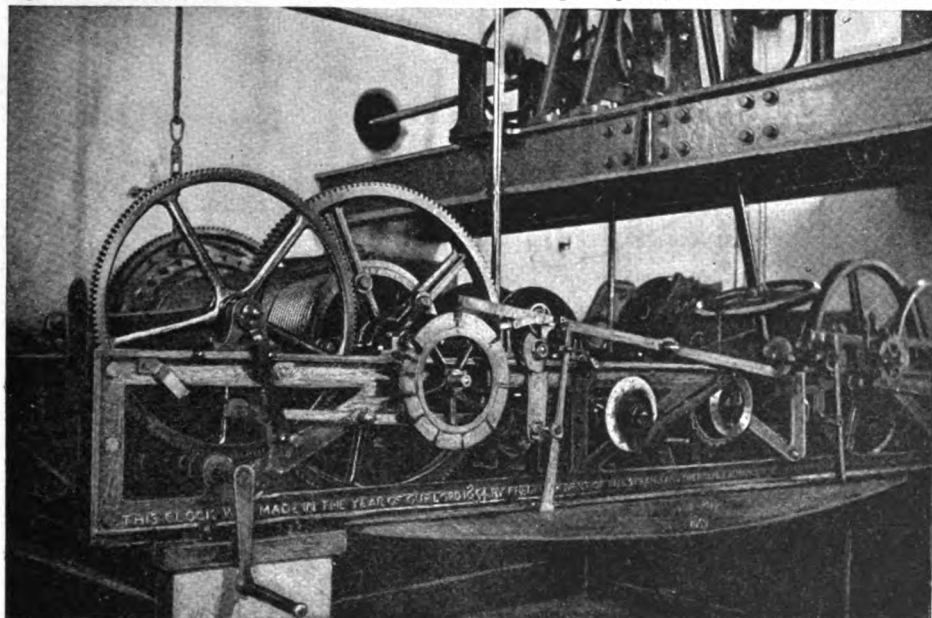


At the top of 360 steps in the Clock Tower at Westminster, Big Ben has marked time for London for fifty years. It is not possible to understand the size of the clock as we stand on the ground. It has four faces, each 23 feet across—nine or ten times as wide as a door. The minute hands are 14 feet long; they would reach higher than an ordinary room. The pendulum weighs nearly 450 lb. The figures on the face are each two feet long, and the minute spaces are a foot square. If you will look closely at your watch, you will see the minute hand move in little jumps; the minute hand of Big Ben jumps half a foot every time it moves. It is not easy to believe these figures, but that is because our eyes deceive us when we look up to a great height, and Big Ben stands so high that if thirty tall men stood on one another's shoulders the top man would only just touch the middle of its face.

THE BIG BELL OF BIG BEN



Big Ben is the great bell which strikes the hours at the Houses of Parliament. It is made of copper and tin, and is nearly 8 feet high and 9½ feet wide at the bottom. But Big Ben is not the largest bell in London. The largest is Great Paul, at St. Paul's Cathedral. Great Paul weighs 17½ tons, and its hammer weighs 180 lb.



Big Ben needs a workshop all his own. The great bell, from which the clock takes its name, hangs by 1,600 feet of chain from an oak beam bound in iron plates. It weighs 13½ tons, and the hammer with which the hours are struck weighs about 450 lb. There is a great noise in the room when the bell is about to strike, and the machine shown in the bottom picture has to be wound up three times a week to give Big Ben the power to strike the hours. It takes two men about five hours to wind up Big Ben for striking.

HOW TO TELL TIME BY THE CLOCK

THE clock-face has a ring of large figures from 1 to 12; these mark the hours. Outside these large figures is a ring of tiny marks; these mark the minutes. One of the hands is longer than the other; the long hand marks the minutes and the short hand marks the hours.

When the short hand points to 1 and the long hand is exactly at the top of the clock-face over 12, it is 1 o'clock. When the short hand points exactly to one of the large figures, the long hand is always at the top, and it is exactly the hour.

But if the short hand is a little past one of the large figures it is some minutes past the hour, and we know exactly how many minutes it is by counting the tiny marks on the outer ring. There are five of these marks between each of the large figures, so that when the long hand is at 2 it is 10 minutes—twice 5 minutes—past the hour.

The minute hand goes round the clock once in an hour; the short hand goes from one large figure to the next in an hour. When the long hand is a quarter of the way round, it is a quarter-past the hour to which the short hand points; when the long hand is half-way round, it is half-past the hour. Here is a full and simple explanation of the face of a clock.

THE face of a clock is divided into 12 clear wide spaces and 60 narrow ones, and each wide space stands for two things. It takes the long hand 5 minutes to cross one wide space, and the short hand one hour to cross the same space.

A minute is 60 seconds, and an hour is 60 minutes. The clock begins with the minutes, and the face of the clock is marked off with tiny lines into 60 narrow spaces. The large hand marks the minutes, and takes exactly one minute to cross one of these narrow spaces. So that this hand takes exactly one hour, or 60 minutes, to pass all the narrow spaces round the clock.

But it would never do to have 60 small spaces and to leave us to guess the exact space which the long hand touched. Put 60 matches in a row on the table, touch one near the middle, and ask somebody to tell you the number of the match you touch, and you will see that a great deal of slow counting is necessary to get the proper number. It would never do to have to spend so long in finding out the time.

So the wise clockmakers mark off 60 narrow spaces into 12 divisions, each division having 5 narrow spaces. When we have to count with our eyes, as we do with the clock, it is hard to pick out one in 60, but it is easy to pick out one in 5, and we have now 12 simple divisions, each with 5 spaces. It takes the long hand 5 minutes to cross one of these divisions, 10 minutes to cross two of them, and 60 minutes, or 12 times 5, to cross them all. When the long hand has crossed all these divisions, therefore, we know that 60 minutes, or one hour, has gone.

That is simple. The long hand crosses one narrow space in 1 minute, two in 2 minutes, 60 in 60 minutes. Once round

the clock by the long hand is an hour. If we had only to think of minutes, that would be quite enough; but as we reckon time in hours and days, and as there are 24 hours in a day, we must have some means of counting hours, as well as minutes, by the clock. So the clock is marked off into hours, as well as minutes, and the hours are marked in a very clever way.

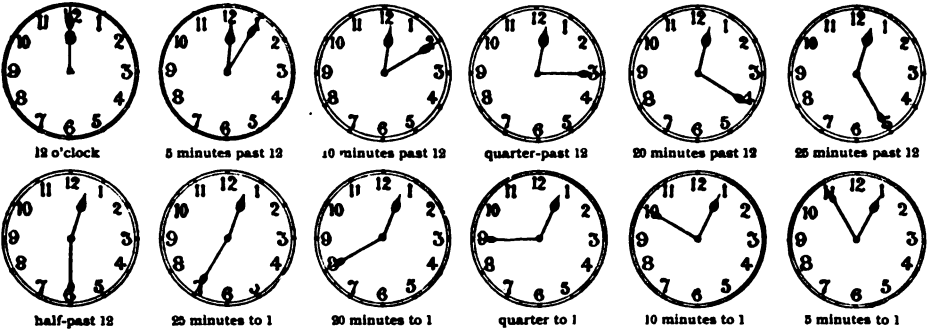
We do not count 24 hours, but only 12, because twice 12 are 24, and it is simple to count 12 hours before the middle of the day, and 12 after. The clock, therefore, has 12 hours marked, and goes round from 1 to 12, when it begins again at 1. We call the first part of the day A.M., which means *before noon*, and the second part P.M., which means *after noon*; and whenever the clock points to 3, or to 4, we know whether it is before or after middle day.

The cleverness of the way in which the clock marks the hours is this. We know that the 60 minute marks are marked off into 12 divisions, and there must therefore be 12 dividing walls to separate them. Now, as the clock needs 12 signs to mark the hours, the figures from 1 to 12 are used to mark off the 12 divisions, and to mark the 12 hours as well.

So that, instead of needing two clock-faces, one for minutes and one for hours, one face serves for both. While the long hand marks the minutes at the narrow spaces, the short hand marks the hours at the 12 big figures between the spaces.

Let us see how this works. We set the clock, let us say, at noon, which is 12 o'clock. Both hands point exactly to 12. In 5 minutes the long hand has crossed the first space, and is opposite the first dividing wall, which is the big

figure 1. That is 5 minutes past 1. In 10 minutes the long hand has crossed the second space, and is opposite the second dividing wall, which is the big figure 2. That is 10 minutes past 1. So the long hand creeps round, in this way :

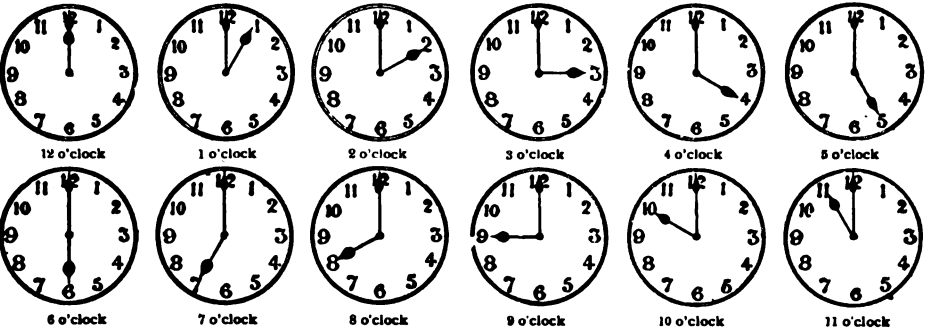


We can easily count the divisions because the big figures tell us. Thus, when the long hand points to the big figure 4, we know that it has crossed 4 divisions, and, as 4 times 5 is 20, we know that 20 minutes have gone. If the long hand points to the big figure 6, we know it has crossed 6 divisions; and 6 times 5 are 30, so that 30 minutes have gone, or half an hour.

All this time, of course, the short hand of the clock is moving also, very slowly, and by the time the long hand has gone right round to 12 again, the short hand has travelled to the big figure 1, and it is therefore 1 o'clock. When the long hand has gone right round twice, the short hand has crossed 2 divisions, and points to the big figure 2; and it is therefore 2 o'clock.

Remember that the big figures mark the hours only, not the minutes, so that when the long hand points to the big figure 2 we must not think it is 2 minutes past something. It is *two spaces past*—that is, 2 times 5 minutes. We are only to count the big 2 as 2 when the short hand points to it.

An exact hour is marked when the long hand is at the beginning of its round, opposite 12, and the short hand points to a big figure. The hours are shown here :



When the long hand is on the right side of the circle, we say that it is so many minutes *past* the hour. But when the long hand begins to go up the left side, we say it is so many minutes *to* the next hour. You can say that it is 40 minutes past 2; but it is much easier to say that it is 20 minutes to 3, and both these mean quite the same.

So as long as the long hand is to the right of the clock-face, we say that it is *past* the hour; when the long hand is to the left of the clock-face, we think of the next hour, and say that it is so many minutes *to* it. For the first half-hour we read forward, for the second half-hour we read backward.

Some clocks are marked in plain figures, but most are marked in the figures the Romans use, called Roman numerals. Here is a table of them, from 1 to 12:

I=1 II=2 III=3 IV=4 V=5 VI=6 VII=7 VIII=8 IX=9 X=10 XI=11 XII=12.

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 1639

HOW INDIA LIES BETWEEN MOUNTAIN & SEA



India, for hundreds of years, lived a life peculiarly its own, cut off from the rest of Asia by the highest mountains in the world. The only ways of reaching this wonderful country are over the mountains or by the sea, and the wild storms of the Indian Ocean prevented the small ships of the earliest sea rovers from reaching it. So that India remained an almost unknown land to the West until the ships of the European nations rounded the Cape of Good Hope. There are but few openings in the mountains of the north-west, such as the Khyber and Bolan Passes.



Camels carrying the merchandise of India over a bridge of boats

INDIA, THE PEARL OF THE EAST

FAR away in the East, on the south side of the continent of Asia, lies the vast country called India, full of people who are very unlike our own countrymen—people who talk a strange language, and wear strange clothes, and live in strange houses, and have strange manners and customs, and strange religions; people who are not all like one another, as English and Scots and Irish are alike, but just as different as they are from Spaniards, or Italians, or Germans.

Yet they all have a kind of likeness, just as all the European peoples have a kind of likeness; they are different from one another, but not so different as they all are from Europeans. For India is a very large country, as large as Germany and Austria and France and Spain all rolled into one; so large that there are about three times as many people in it as there are in our own country—nearly 300 millions of people! And it is the business of a few thousands of English people to rule over all those millions; to give them good laws, and to make sure that the laws are obeyed; to prevent the strong from injuring the weak, and the cunning from injuring the simple; to give justice to all with an even hand.

India is not only a very big country, but mountains and rivers and plains, the geographical features, are what

CONTINUED FROM 1466



we call on a very big scale—as if we looked at the things to which we are accustomed through a powerful magnifying glass. The highest mountain in the whole world, Mount Everest, is on the Indian frontier; it is more than four times as high as Mount Mitchell, one half higher than Mount McKinley, and nearly twice as high as the biggest in Europe, Mont Blanc.

The two biggest rivers, the Indus and the Ganges, are not quite so large as the Volga or the Danube, but are both five times as long as our own Hudson. And in like manner, the biggest kinds of wild animals live in India—elephants, which man has tamed for his own service; lions, though they are few now; great leopards and tigers, the strongest and most beautiful and most cruel of all the cousins of our tame cats; and fierce wild cattle, with mighty horns, which the tiger himself is often afraid to fight; and crocodiles in the rivers, which will drag down men and cattle if they catch them; and snakes, large and small, including the most terrible of all, the deadly cobra, for whose bite there is no cure. Again, in like manner, the Indian sun scorches with a heat we can hardly imagine in New York, and rain falls in rushing torrents such as we never see in the biggest thunderstorms that burst on our own country.

Now let us look at the whole of this big country, with the map appearing on the opposite page, and notice the important things about its formation, its boundaries, its mountains, its rivers and plains.

HOW INDIA IS HEMMED IN BY THE MOUNTAINS AND THE SEA

First of all you see that the southern half of India is a triangle or wedge, pushed out into the Indian Ocean, so that it is bounded on the south-west and on the north-east by the sea. This part we call the Peninsula. And then you see that a huge chain of mountains curves in a rather crooked sort of way from the top left-hand or western corner of the Peninsula northwards, and then eastwards till it comes down to the top right-hand corner; so that on the north-west, and north and north-east, India is bounded by mountains.

You cannot get at India at all, unless you come to it by sea or make your way through the mountains. And those mountains are so high and so difficult to get through, that there are really only two passes by which armies have been able to get into India, and both of these are on the north-west side. So that if those passes are so well guarded that an enemy cannot force his way through, an invader cannot get into India unless he comes across the sea. There, you see, is a very good reason why the peoples who inhabit India grew up apart from other nations, so as to be unlike them, keeping their own manners and customs; for in ancient times, fleets of ships could not make long sea voyages as they do now, and the coast of the Peninsula was too far away from other lands for anyone to think of invading India by sea. Sea and mountains were a barrier between the Empire of India and the rest of the world.

THE NORTHERN HALF OF INDIA WHICH IS CALLED HINDUSTAN

The next thing to notice is that the wedge broadens out a great deal at the top, and just below the place where it broadens is a river which rises a little east of the middle of the country, and flows very nearly due west, till it falls into the western sea. This river is called the Nerbudda, and it divides India into a northern half, which is called Hindustan, and a southern half, which is called the Deccan.

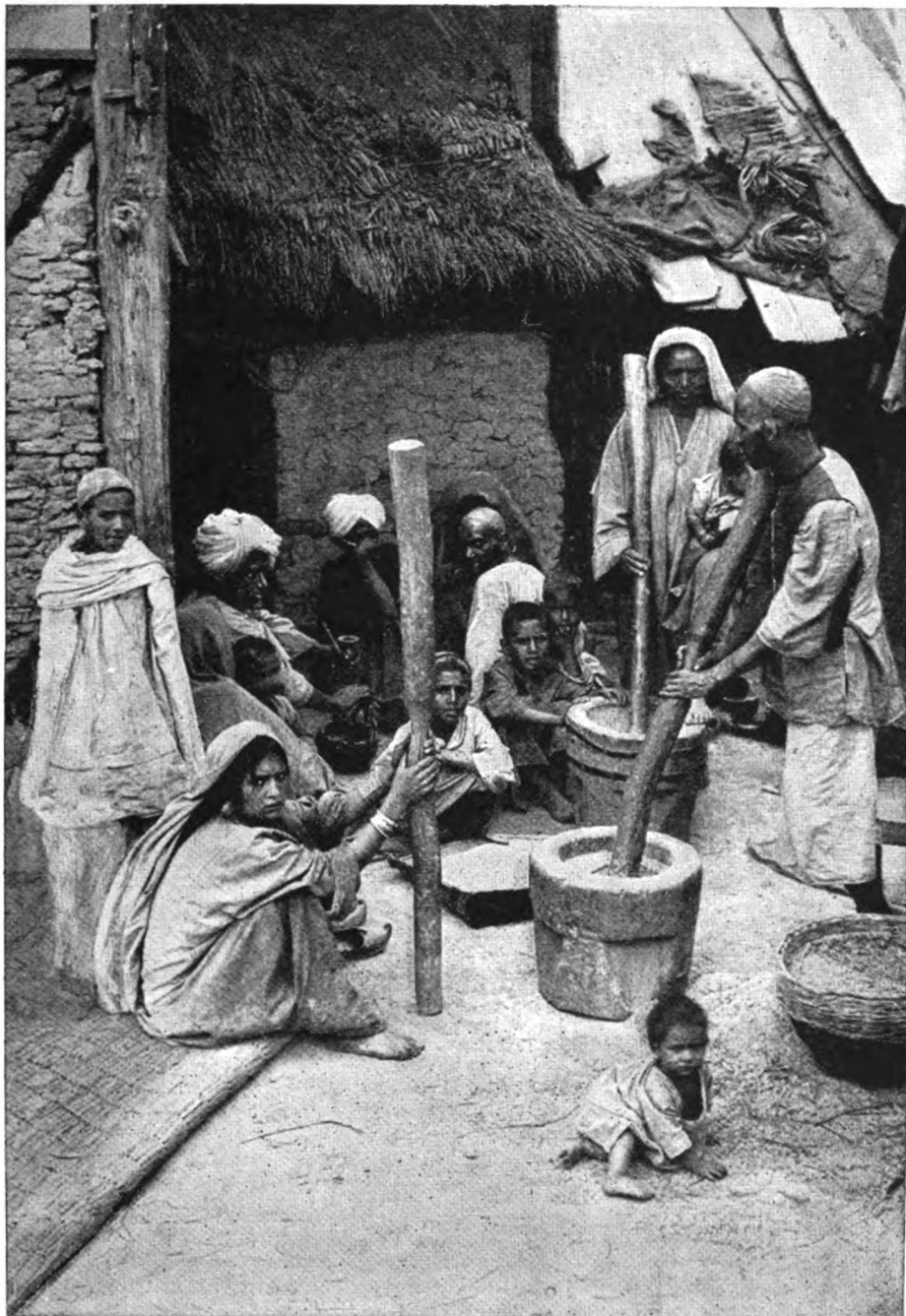
Now, in Hindustan are two very big rivers. On the west, flowing almost from north to south along the foot of the barrier-mountains, is the Indus; and several other rivers join together and flow into the Indus when it is about half way on its journey to the coast. The land through which these rivers flow, down to where they all join the Indus, is called the Punjab, which means the Land of the Five Rivers. The other great river, which flows from west to east, is called the Ganges, and some people, when they talk of Hindustan, mean just that great low-lying plain watered by the Ganges and the rivers which are its tributaries. The plain, or basin, of the Ganges is the most fertile part of India. But between the lower part of the Indus on the west and the Ganges on the east, there is a great deal of country where there are no rivers at all, and very much of this is desert.

THE SOUTHERN HALF OF INDIA WHICH IS CALLED THE DECCAN

In the Deccan there is nothing like the great plain of the Ganges, or even the Punjab. Most of it is high tableland; steep on the west side, where the mountains are called the Western Ghats, and there is only a narrow strip of low land lying between the hills and the coast; but shelving down on the eastern side, so that here and there are wide plains which form the district called the Carnatic. One of the great rivers of the Deccan is called the Godavery; it is famous for some very wonderful waterfalls. Right in the heart of the Deccan there is a place called Golconda, which was once the capital of a mighty kingdom. In those regions great store of gems was found, and these were brought to the jewellers of Golconda, so that the wealth of Golconda became a proverb.

India is a very hot country. Sometimes in winter, up among the high barrier-mountains—which are hardly in India—it is quite cold. All other places, even the coolest, are much warmer than England; and in all the great plains where the rivers flow, and still more in those plains where there are no rivers, it is always hot. In the hot season the heat is so trying that many Europeans become ill if they stay long, so that English people have

THE HOME-LIFE OF THE PEOPLE OF INDIA



In India most of the people earn their living by growing rice, wheat, and other crops. They are their own millers, and here we see some friends who have gathered together outside one of their thatched huts to grind some rice by placing it into a stone jar and pounding it with short poles. While doing this they can talk to one another and look after their children playing round them. Life among these people is very quiet and peaceful, unlike that of our city people, who spend their lives in mills, factories, and workshops, amid the ceaseless whirl of machinery. The Indians weave beautiful shawls and carpets, and hammer and carve out beautiful brass pots and tables such as we all know and use in our homes. Their needs are few and simple.

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taken to going up to "the hills" in the hot weather, or, at least, to sending their wives and children to the hills if they have to stay behind themselves; and it is hardly safe to go out of doors, except early in the morning and late in the evening. For that reason, too, there are very few places where it is possible for English children to grow up strong and healthy; so that when Englishmen in India marry, they know that sooner or later they will have to send their children home to be brought up in England, and that their wives will often have to choose between being parted from their children and being parted from their husbands.

There are many great cities in India, of which the largest is Calcutta. In old times, and until quite a short time ago, the British people who were at the head of the Government in India used to live at Calcutta; but now they generally live at Simla, which is in the hills, because Simla is healthy, and Calcutta is terribly hot.

THE GREAT RIVERS OF INDIA AND THE GREAT PORTS ON THEIR BANKS

Long before the Ganges reaches the sea, it divides into a number of rivers, one of which is called the Hoogli. The names of places in India are rather puzzling, because there are different ways of spelling them; but they are spelt here so that you can read them just as if they were English words, and then you will pronounce them as English people usually pronounce them; only you must remember generally to sound the letter *a* either the same way as in *call*—for instance, in Bengal; or as in *can't*—for instance, in Punjab.

Ships can sail up the Hoogli, and so a place on the banks of the Hoogli became a port, which grew into Calcutta, as our port on the Hudson grew into New York. The second great port of India is on the west, at Bombay, which was given to Charles II. of England by the Portuguese as part of the dowry of his bride, Catharine of Braganza. The third is Karachi, on the Indus. There are other harbours on the west coast, but none so large; and on the east no good ones at all, though ships can get fair shelter off Madras. When the gales, which are called "monsoons," blow, as they do regularly at certain seasons

of the year, fleets cannot remain in safety on that part of the coast.

Most of the great towns in England and Scotland have grown large either because they were ports to which foreign merchants came with their goods and from which English merchants sent their ships, or because there are big "works" there for manufacturing something, like steel or cotton or pottery; and most of the people make their living by working at some industry or other of this kind, or by buying and selling the goods that are manufactured.

HOW THE GREAT AND BUSY CITIES OF INDIA GREW UP

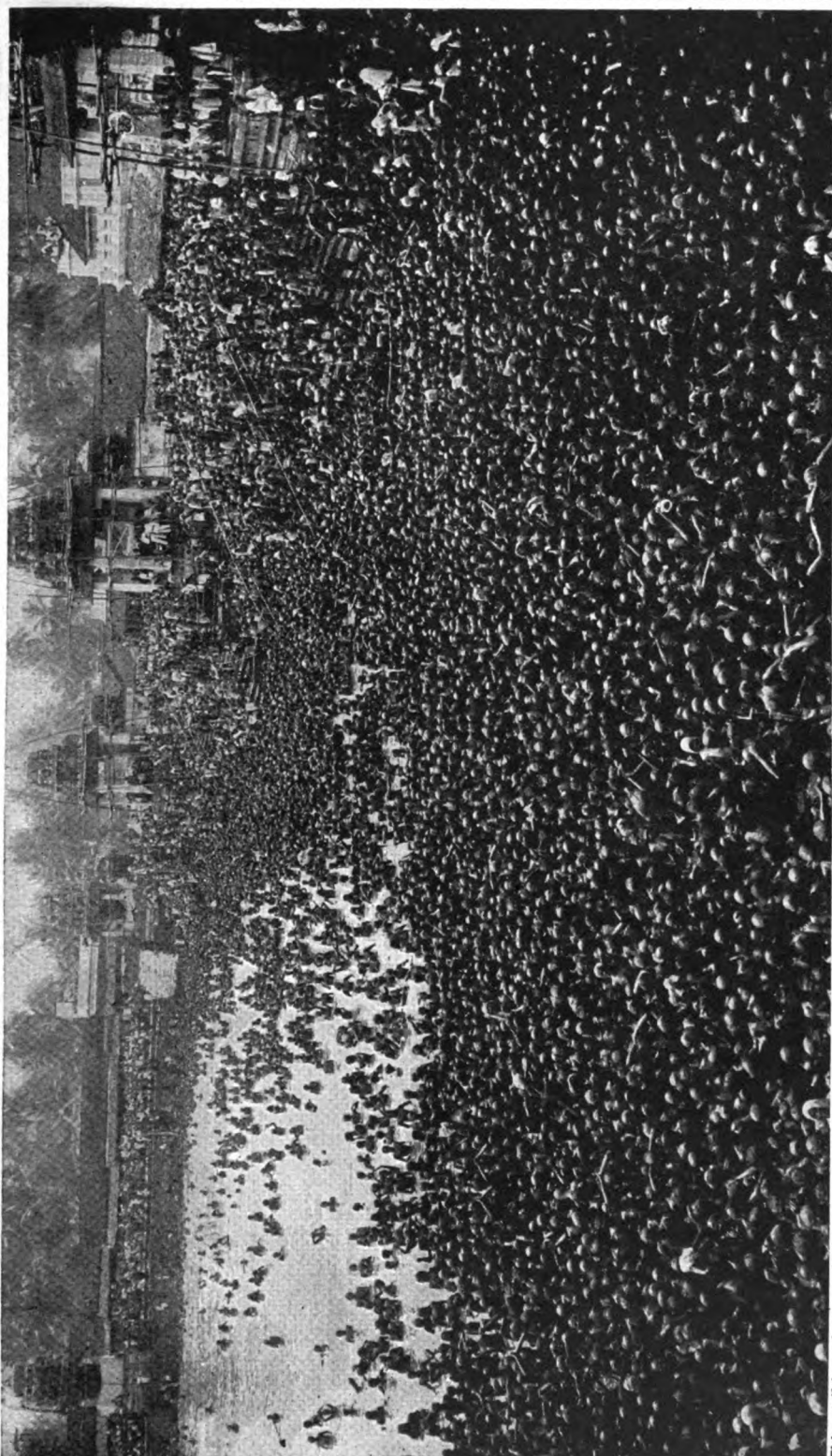
But in India, most of the people make their living by tilling the soil, which grows rice or wheat or millet. There the big cities grew up because emperors and kings found they were convenient places to build their palaces in, as they could be well fortified; and as the kings lived there with their courts, men collected round them, that the people of the court might buy their goods, and that they might be protected against robbers or the raids of enemies. And other cities grew up on spots which were held sacred, as sometimes in Europe towns grew more quickly where there was a famous cathedral or abbey. So that the largest towns, except the few ports, were generally at one time either the capital of a kingdom, or places to which people went on pilgrimages, or strong fortresses.

In India there are very few manufactures such as we have, which bring together great numbers of men to work in factories, and the big cities are therefore few. You can travel immense distances without seeing one at all, and in other places where, in ancient times, great cities have stood, are the ruins of buildings that were once magnificent.

DELHI AND THE PEACOCK THRONE, AND AGRA WITH THE WONDERFUL TOMB

Of the old cities, the most famous of all is Delhi, because for many centuries the mightiest monarchs in all India reigned there—even for centuries before the great Moguls made themselves lords of India. There, in old times, was the wondrous peacock throne, gleaming with precious stones, said to have been worth millions of pounds. A conqueror came and carried it away, and the jewels were scattered. But the most beautiful

ONE OF THE MOST REMARKABLE LIVING SCENES IN ALL THE WORLD



This striking photograph shows us one of the most remarkable sights to be seen anywhere in the world—the bathing of an immense crowd of people in water overflowing from the great River Ganges, in Northern India. The people believe that the water is sacred, and hundreds of thousands of pilgrims bathe in it, believing that some good will come to them.

buildings in India are at a much younger city—Agra. There are people who think that the Mohammedan mosque, or temple, called the Pearl Mosque, or the Moti Musjid, and a fine tomb called the Taj Mahal, are the most beautiful buildings in the world. The Taj, which is, perhaps, the most famous building in India, was built by one of the Moguls named Shah Jehan, as a memorial to the wife he loved, who lies buried under its dome with Shah Jehan beside her. Here also Shah Jehan built the White Palace, which is one of the fairest palaces in the whole of the world.

THE KIND OF PEOPLE YOU WOULD MEET IN A WALK IN INDIA

Now think of this—that if you travelled all over India and saw all the people there, not so many as one in every thousand would be white. That is to say, all the natives have brown skins—some dark brown, some light brown, but all brown; and there are a thousand natives for every European. Out of them all, very few indeed are Christians; the religion of nearly three-quarters of them is Hindooism, and nearly one-quarter are Mohammedans, or, as they are often called, Mussulmans.

The Mussulmans believe in the teaching of Mahomet, who, they think, was a prophet sent by God. A great many of the Mussulmans—most of them, perhaps—belong to races which have fought their way over India as conquering armies some time or other during the last thousand years. Some of these are Moguls, or Turcomans; more are Afghans, or Pathans. (Remember to pronounce the two *a*'s in each of those words just as you pronounce the *a* in *pass*; and also to pronounce *t* and *h* in Pathans separately, as in *at home*, not together, as in *the*.)

THE GREAT DIVISION BETWEEN THE MUSSULMAN AND THE HINDOO

These Mussulmans think of themselves as soldiers, descended from a race of victorious soldiers, who have been rulers of the country in the past, and there is a great division between them and the Hindoos, whom they look upon as infidels. Hindoos and Mussulmans keep separate; they do not marry each other, and in many parts of the country, even under British rule, they can hardly be kept from fighting each other.

Most of the people in India, however, are Hindoos, just as most people in Europe are Christians; but there are differences in the religion of Hindoos, just as there are among Christians. According to the Hindoo religion, there are an immense number of gods, and different gods are held in honour in different parts of the country and among different classes of people, who believe that they are under the protection of this or that particular god. Some of these gods are worshipped with strange rites, and some used to be worshipped with rites that were even horrible, until they were forbidden by the British. Men and women used to torture themselves hideously, thinking to please the gods thereby. English people used to believe that at the festival of one of these gods called Juggernaut—which was only one of his many titles, and meant Lord of the World—the Hindoos threw themselves down before the great car on which the idol was dragged from one temple to another, thinking that if they were crushed to death under the car they would win happiness in the life hereafter; but that was not really true.

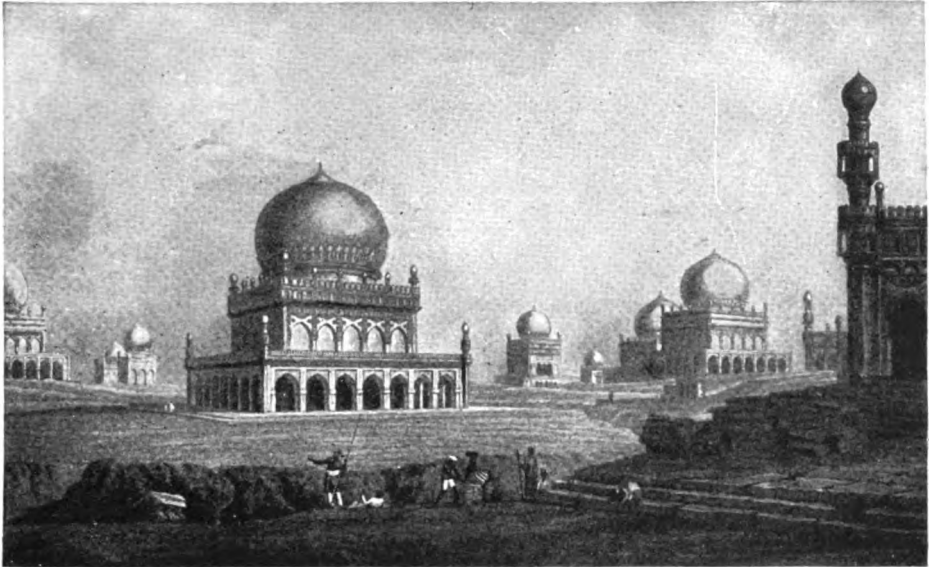
TERRIBLE THINGS THAT HAPPENED IN THE PAST, AND THE CUSTOM CALLED "CASTE"

Perhaps it was believed because people really did die from their exertions in dragging the car. But the "car of Juggernaut" has become a proverb. Great temples, or shrines, were built long ago in honour of some of these gods, which have in them wonderful carvings and idols or images.

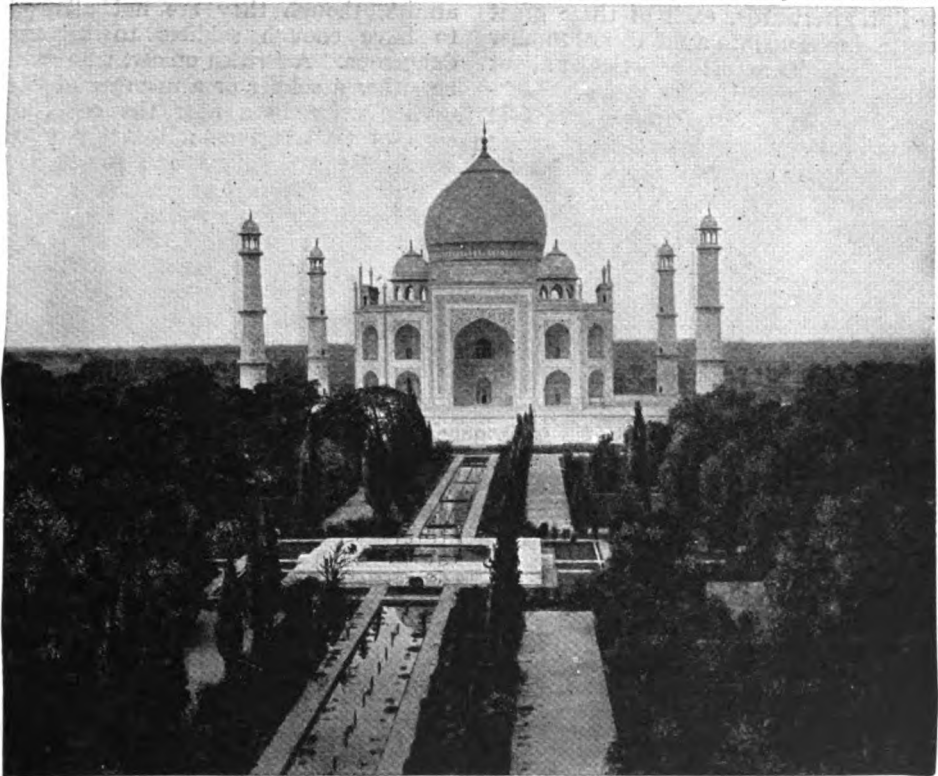
Less than a hundred years ago, there was a practice among the Hindoos which seems to us very shocking. When a man died, his body was burned; but the custom was for the widow, if she wished to be praised and to be remembered for her virtue, to burn herself alive on her husband's funeral pyre. And because this was supposed to bring some great good to the husband in the life to come, the widows were often forced to do this by the dead man's kinsfolk. This was called "suttee." It is never done now, however, because the British stopped it about eighty years ago.

The most remarkable and important custom among the Hindoos is what is called caste. In ancient times, there

THE WONDER AND BEAUTY OF INDIA



Nowhere in the world are there such splendid and wonderful buildings as in the East, and the temples and tombs of India are the things that impress all travellers. Not only did the old rulers of India build themselves glorious palaces to live in during their lives, but they built stately tombs for themselves to lie in. The beautiful buildings in this picture are the tombs of the kings of Golconda. The bodies are placed directly under the domes.



This beautiful tomb with the stately approach, often called the most glorious building in the world, is the famous Taj Mahal at Agra, built by the Mogul Emperor Shah Jehan, as a memorial to his wife. He lies buried beside her.

were four divisions among them, each of which kept separate from the others, and married wives who belonged to their own division, or caste; and the children were of the parents' caste. The priests and teachers belonged to one caste, who were called Brahmins; and the soldiers to another. These, and also the third caste, were parts of a race which conquered most of India; but the fourth caste were considered as base-born, because they belonged to the conquered peoples; and the conquerors imagined that they themselves were not only superior in this world, but would be superior also in the next life. Among themselves they supposed that the Brahmins were superior to all the others, and the warriors to the third caste. If a man broke certain laws, however, even if he were not really to blame, he was degraded from his own caste and became no better than one of the base-born; therefore it was held to be a very terrible thing to lose caste.

THE GREAT NUMBER OF SMALL PARTS INTO WHICH THE PEOPLE ARE SPLIT UP

But afterwards, each of these great castes broke up into a number of smaller castes, which are just as particular about not marrying into other castes. High-caste people will not touch food that is cooked by people of low caste; and if people eat certain kinds of food, or if they cross the sea, or if they do many other things which seem to us not to matter at all, they lose their caste, and can only save themselves by suffering certain punishments. There is nothing the Hindoo fears so much as doing anything which will cause him to lose caste, and there has often been trouble because of Europeans forgetting how much they think about it, and making rules for soldiers or giving orders to servants against the caste rules.

There are some animals, too, which the Hindoos look upon as sacred. The most sacred of all is the cow, so that to kill or injure a cow is a terrible sin in the eyes of a Hindoo. But the Mussulmans think it sin to hold animals sacred, or to pay honour to images and idols, for the Mohammedans worship the true God, as the Christians do; but because Christians believe that Christ is the Son of God, and that Mahomet was simply a great leader of men, the Mohammedans think that Christians and Jews

are really no better than heathens and idolaters. But the Hindoos think that the Mussulmans and the Christians, being of no caste, are certainly no better than their own lowest caste.

HOW THE BRITISH RULE OVER THE VAST EMPIRE OF INDIA

Now, all these Hindoos and Mussulmans are ruled over by the British. In about half the country, all the people who look after the Government are British, except that a few natives are allowed some share in the work. In these parts of India there are a number of regiments of soldiers from Great Britain, and nearly twice as many regiments of native soldiers; but in these native regiments the higher officers are British. If you speak of men in the Indian Civil Service, that generally means that they are in charge of a big or small district in these parts.

The other half of India is made up of a number of native states, ruled over by their own native princes, who generally have the title of Rajah or Maharajah; and these princes have their own armies, though they are not allowed to have enough soldiers to become dangerous. A British officer, who may be either a soldier or a member of the Civil Service, lives near the court of each of these princes; sometimes he is called the Resident, and sometimes the Agent. It is his business to see that the native princes govern properly, though he does not interfere unless they govern really badly; and it is his business also to give advice, and to keep the Viceroy of India and his Council informed about everything of importance that is going on.

THE NATIVE PRINCES WHO ARE LOYAL TO THE BRITISH FLAG

For at the head of the whole Government of India is the Viceroy, or Governor-General, and his Council; and when the Viceroy says that a native prince must do this or must not do that, the prince must obey. How it came about that these native states were built up; how the British first became rulers of one bit of India 150 years ago; how they had to go on bringing one province after another under their own rule, and finally to require the obedience of all the native states—the story of all this we have now to read.

The next story of India begins on 1699.

The Child's Story of THE EARTH

WHAT THIS STORY TELLS US

AN atom, we know, is built out of tiny bricks of electricity called electrons. In these pages we learn how tiny the electrons are—far tinier than the atoms of the elements, though these are infinitely tinier than anything we can see. The atom, then, is a building; but it is a building that is in motion all the time, for its bricks are never still. These bricks, or electrons, really move inside the atom, probably like the planets moving in the solar system. The atom is a little world, countless billions of which make up the big world we know—whilst that big world is perhaps only an atom in a world bigger still. In the atom-world there must be some central power which keeps it all together, as the sun keeps everything together in the world we call the solar system. We know almost nothing about this power as yet; but we learn here what is known about the electrons which it holds together to make the atom, how they move, and what they are made of.

THE WORLD INSIDE AN ATOM

WE have learned something of the wonderful little bits of electricity called electrons that fly about in the atoms; and we may now think for a minute or two about the size of these. They are so small that we can only give ourselves some faint idea of their size by a comparison. Evidently we must begin by trying to get some idea of the size of the ordinary atoms of matter. That great genius, Lord Kelvin, the greatest student of these subjects since Newton, devoted some time and trouble to this subject. His opinion was expressed in some such way as this: A drop of water, we know, is made up of molecules of water, each of them consisting of three atoms.

Doubtless an oxygen atom is much bigger than a hydrogen atom; but, in the question we are talking about, we need not trouble about that. Let us try to suppose, then, that a single drop of water were magnified so enormously as to be the size of the earth.

Then the atoms that make it up would appear probably somewhere between the size of small shot and a tennis-ball. Perhaps it might help us a little to look at the matter in the opposite direction. Imagine this great earth of ours, twenty-five thousand miles round, made of, let us say, one great heap of marbles; and then think of that whole earth shrinking down into the size of a drop of water, and try to imagine how small those marbles would have to be. Yet that

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would be something like the size of the actual atoms in an actual drop of water.

Well, when Lord Kelvin made this calculation—which was not a matter of mere guessing, but depended upon many things, such as the changes in colour of a soap-bubble as it gets thinner—he was thinking of atoms as the simplest and smallest possible units of matter. But now we are to think of atoms as themselves made of things which are smaller still; and the question is, How much smaller? Let us imagine that we could take a single atom of average size and make it as large as some great hall or church—I mean a very large hall, or a cathedral, rather than an ordinary church. Now, according to the old view, an atom magnified like that would look like one great, simple, solid crystal, sharply defined, nowhere worn, having no parts, and incapable of being divided up.

But, according to the new view, the atom would be much more like a great hall, for there would be plenty of space in it that was not filled; it would be roomy, so to say. But in it there would be contained various things which made it up. These would be flying about inside it, probably round and round, in a quite orderly way, somewhat as the planets fly round the sun in the solar system. And the size of these things—which we have learned to call electrons—would be about the size

of a period on this page if the atom were magnified to be the size of a large hall. Now, the size of a period, compared with the size of a great hall is, of course, the tiniest of tiny things ; and yet we have learned that the atom is really so small that if a drop of water were magnified to the size of the whole earth, the atoms would only be about the size of marbles.

LOOK AT A PERIOD ON THIS PAGE AND THINK WHAT IT IS

This is the best that we can do in order to give us some little idea of the tiny size of an electron ; and we may remind ourselves here that, so far as all the evidence goes, this size is a constant, fixed, and universal thing, true of all electrons, whatever atom they come from, and whether that atom be found on earth or in the sun or anywhere else.

These ideas are so big, though the things with which they deal are so small, that we can scarcely realise them. Let us, then, just look at the period which ended the last sentence, and try to see with the mind's eye what it is really made of. It is a small and neat round blot of black ink on the page. This ink is made of various things—some put in to make it sticky, some put in to make it black, and so on. But we may describe it as a solution of certain salts of the wonderful metal iron, about which we have read something already. It is one of the peculiarities of the salts of iron that they are nearly all richly coloured. The amount of salt in the blot of ink we call a full-stop is not very much, but it must contain certainly millions of millions of atoms—some of them of iron, and others of the various elements making up the particular salts of iron and other things in the ink.

A PERIOD HAS MORE PARTS THAN THERE ARE PEOPLE ON THE EARTH

If as many more atoms were added to the blot as there are human beings on the whole earth—say, sixteen hundred millions—even that number would not nearly be sufficient to make the blot look any larger to our eyes. Yet each of those atoms, tiny though it must be, is itself, compared with the things in it, a great roomy space in which they fly about ; and the size of those things or electrons compared with it is like the size of a period compared with a great hall.

These ways of trying to express the size of electrons are much more valuable than we might think. It is not merely that they give us some little idea of what the sizes really are. They do far more than that. We can use these pictures to give us some idea of what the structure of the atom really is.

We said that if the atom were the size of a great hall, the electrons would fly about in it—perhaps rather like the earth and the other planets flying round the sun. Now, some of the greatest thinkers at the present day have made us see that this is something more than a mere fancy picture. They are deliberately asking us to think of the atom as if it were a sort of solar system.

The solar system, we know, is roomy. I mean that, though there are several planets in it, yet there is abundance of room between them. Even at times when the earth is nearest to her nearest neighbour, Mars, there are tens of millions of miles between them. Another way of saying this would be that, compared with the size of the whole solar system, the planets which help to make it up are very tiny, so that there is abundance of room between them.

THE WONDERFUL MOVEMENT GOING ON FOR EVER INSIDE AN ATOM

Now, the same is true of the electrons in the atom. Though the atom itself is so tiny, yet the electrons are so much tinier that, compared with their own size, there is as much room between them as they circle round within the atom as there is between the planets as they circle round within the solar system.

For there is every reason to believe that the electrons *do* move round within the atom. We have no right to say that they move round in regular circles, nor in regular ellipses, as the planets do in the solar system ; but we know for certain that they are always moving, and that they move in a regular, orderly, systematic way. We are sure, indeed, that, just as we may speak of a *solar system*, so we must now speak of an *atomic system* ; and every atom is an atomic system. We shall begin to see how great this discovery is if we remember that for thousands of years we have been told that we should look upon matter as gross, brute, dead, inert, passive, inactive. We are now

learning that the atoms making up matter, which we were told is inert and dead, are the scene of tremendous forces of ceaseless and wonderful activity, not one whit less wonderful than the solar system itself, for wonderfulness is not a matter of size.

Now, what is it that keeps the solar system together and makes a system of it? We know very well that it is the attraction of the sun. The system has a centre from which it is controlled, and by which it is kept in order. If the sun were to vanish, all the planets, instead of flying round it, would begin to move in straight lines, and soon there would be no system at all, nor anything like it. Even if the sun were only to lose its power of attraction, the planets would immediately fly away, and there would be an end of the solar system.

Now let us consider the case of the atom. The electrons in it are moving with great speed and power; they are all of the same kind, and a notable fact about them is that their tendency is not to attract but to repel each other.

THE THING THAT KEEPS THE ELECTRONS FROM FLYING OUT OF THE ATOM

An electron tends to push away, and to be pushed away from, any other electron. Yet large numbers of these little bodies exist in the atom, though the tendency of each is to fly away from all the others. Further than this, they are in motion, and the tendency of everything which is in motion is to go on moving in a straight line for ever. Yet, at any given time, most of them remain within the atomic system, just as the earth remains within the solar system. It is the central attraction of the sun which prevents the earth from flying away. Must we not, then, argue that the existence of the atom would be impossible if there were not some central attraction preventing the electrons from flying away, so powerful that the electrons can all keep together, even though their tendency is to repel each other?

There is no doubt as to this. Just as the solar system would be impossible without the sun, so the existence of an atom would be impossible without the presence of some force within it which held together and controlled all the electrons that go to compose it. And here we come upon something new and must use two new words. We

say—though in so saying we must not fancy that we fully understand what we are talking about—that electricity may exist in two kinds. We are not here talking about *electric waves* at all; they are utterly different, and some day when we have more sense they will have a special name. These two kinds are contrasted with each other, and for convenience we call one kind *positive*, and the other *negative*.

THE TWO KINDS OF ELECTRICITY THAT WE FIND IN THE ATOM

Now, the reason for distinguishing these two kinds, and for giving them these names, lies in their relation to each other. Positive and negative electricity attract each other; but two negative electricities or two positive electricities will repel each other. Now, all the electrons we have been talking about—these tiny but wonderful things which fly about in the atomic system as the planets do in the solar system—are of the kind called negative. They are often described as *negative electrons*. Similar kinds of electricity repel each other, and when we find a number of electric particles or atoms all negative, living together in the same atom, we may be quite certain that, if only we could find it, there must be some positive electricity in the atom which is holding them all together; and that is the case.

We must think of the atom as if it had in the centre a "sun" made of positive electricity—the bond which holds the atom together; and then around this, within its "sphere of influence," as we say, there are a number of electrons or particles of negative electricity in ceaseless movement within the atom, but controlled by the core, or centre, of positive electricity.

AN ELECTRON COULD GO ROUND THE WORLD IN A MOMENT

This, then, is the system that makes the atom, and the parallel between an atom and the solar system is not only beautiful and interesting, but there is general agreement that it is also the most helpful and instructive way of looking at the atom that we can imagine at present.

Of course, we must ask ourselves what these positive and negative electricities that we talk about really are, and that is the question of questions for this branch of science to-day.

About positive electricity we know scarcely anything, but in various ways it has been possible, especially during the last eight years, to learn a great deal about negative electricity. We know that the electrons move out of the atom at a rate of about 30,000 miles a second, which means that it moves so fast that it could travel round the earth in a single moment; we know that because they are electric they put the air around them into a peculiar electric state; we can weigh them, in a sense, and we can study the force with which they repel each other.

We are also beginning to get some notion of the numbers of them that exist in atoms of various kinds—comparatively few in a small atom like that of hydrogen, but vastly larger numbers in a big atom like that of radium. We shall not quote here the numbers that have been suggested, but may merely say that they run to several hundreds in the case of the hydrogen atom, and tens of thousands in the case of atoms like those of mercury or radium. This subject, however, is being worked at hard just now, and it will be wiser if we are not too sure at present.

THE WAY IN WHICH WE ARE BEGINNING TO FIND OUT ABOUT THE EARTH

It is specially interesting to learn that the study of electrons helps us to understand why it is that certain kinds of atoms exist and not other kinds; why there are about eighty elements and not, say, 80,000; why the elements run in groups; why iodine is like fluorine in many respects, though they are so different in others, and so on.

Thirty years ago there was nothing to be said except simply that there were so many elements with such and such properties. No one could say *why* there should be these elements and not others; nor why oxygen should have the properties of oxygen and gold the properties of gold. These are great questions which we must be able to answer if ever we are to understand fully the story of the earth; and they are now beginning to be answered by the new discoveries regarding the nature of matter. Thirty years ago we thought that in finding the atom we had finished. Now we see that in finding the atom we have only just begun.

But we must not leave this part of our story without trying to understand what it really means, which is that big and little are only ways of talking, and really do not mean very much. Anything that is bigger than ourselves we call big, and anything that is smaller we call small; or anything that we can see without trouble we call big, and anything too small to see with our unaided eyes we call small.

BIG WORLDS AND LITTLE WORLDS AND WORLDS WITHIN WORLDS

But this is making us and our eyes the measure of all things, and we have no right to do that. Really there are worlds within worlds.

There is the familiar world that we see around us. The earth is in the middle of it, as we think, and everything that is in the sky goes round it. But really nothing goes round it but the little moon, and our world is only a part of a system with the sun as its centre. This solar system, then, is another world outside our world, but the solar system itself is only a part of the world of stars.

Or, instead of looking outwards, look inwards. We have invented an instrument called the microscope, and have found a world of little living things which no one had dreamed of, yet quite as lively and real and wonderful a world as the one we all know. Then, by the aid of chemistry, we can pierce to a world smaller still, though just as wonderful. We pick up the bodies of living things, and water and stones and dust, and we find them all made of atoms. We thought that *that* was the smallest world that could be.

WE KNOW LESS ABOUT AN ATOM THAN WE KNOW ABOUT A STAR

But each atom is a world of its own. We actually know less about the wonders of the world or system we call an atom, about its balance and history and structure, than we do about the world or system we call the solar system. We think that we have found in electricity the real first stuff out of which matter is made. But electricity is, perhaps, only a part of a still deeper world, the world of ether, which lies beyond.

Yet some people say that when science begins to dissect and analyse Nature, all the wonder and beauty of things is destroyed. How little they know! The next story of the Earth is on page 1665.

The Child's Book of POETRY

POETRY OF JOY AND SADNESS

EVEN reading without being careful to think over what one has read, it is not possible to have read as many poems as we have now printed without noticing that the feelings expressed in them, and the feelings they have awakened in us, are constantly changing. Nothing that is written touches our feelings or emotions so quickly and so deeply as poetry does, and below we read of some of the many different ways in which it can affect us.

OUR FEELINGS IN POETRY

To make his fellow-men feel something of the joy that may be filling his own heart is one of the greatest things the poet can do. Indeed, all great things in literature have been accomplished by men and women giving to the world a powerful impression of their own inner thoughts, feelings, and experiences.

We are all moving through life to the Life that is beyond—our earthly pilgrimage, it is called; and nothing can be more interesting to us than to know what is happening to our fellow-pilgrims, what they think of the great journey; and those of them who have the power to tell us are our great poets and philosophers.

But joy is not the only feeling the poet experiences. Far from it. Sadness is often the feeling that comes to the thoughtful mind; joy more often keeps company with the thoughtless. The poet knows all our feelings: joy, sadness, hope, and the many different shades of these. We may call them "moods," meaning the frame of mind we may be in at one time, which will be quite different from our feeling at another. Poetry is the only lasting way of expressing these varying feelings so that they may be recalled long after they have passed away.

Now, this power to enter into the moods of others, and to draw hope from the words of the poets, is a great and precious thing. Hence, the writers whose poems have most of human feeling in them are most likely to be of service to mankind. But it must not be supposed that we can profit by reading only what we may call the poetry of joy—that is to say, cheerful

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poems. Sorrow and sadness are quite as important to make our life complete; nay, they are needful to make us truly happy. We could not know true joy if we never knew what it was to be sad. So the poet must at times sing songs of sadness. Milton, as we shall learn later, wrote two fine poems—they are quite short, and can each be read in ten or fifteen minutes—the one entitled "L'Allegro" and the other "Il Penseroso."

The titles are taken from the Italian, and mean the cheerful and the pensive. That is to say, the first is a poem written, as it were, by a cheerful man, and the second by a melancholy man. The cheerful man looks at Nature and the world with the singing of the lark, and the melancholy man with the notes of the nightingale.

The one begins, "Hence, loathed Melancholy!" and the other, "Hence, vain deluding Joys!" Yet both are the work of the same poet, and convey feelings that must come to all of us in our different moods. The use of sadness in poetry is to purify our thoughts, to balance our minds; for if we were always laughing with the jesters we should in time become incapable of earnest thought, and, as Longfellow tells us:

Life is real, life is earnest,
And the grave is not its goal.

From a wise mixture of joy and sadness springs hope, and so we are enabled to endure the trials of life. English poetry is full of hope, because it is healthy, sane, and, as we have seen, in love with the fresh, green country.

OLD FOLKS AT HOME

This well-known song by Stephen Collins Foster is a great favourite all over our land, and expresses the feelings of a Southern darkey after the desolation of the Civil War had swept the South bare, and thrown the darkeys out into the world to depend upon their own resources.

WAY down upon de Swanee Ribber,
Far, far away,
Dere's wha my heart is turning ebber,
Dere's wha de old folks stay.
All up and down de whole creation
Sadly I roam,
Still longing for de old plantation,
And for de old folks at home.

All de world am sad and dreary,
Ebery where I roam;
Oh, darkeys, how my heart grows weary,
Far from de old folks at home!

All round de little farm I wandered
When I was young,
Den many happy days I squandered,
Many de song I sung.
When I was playing wid my brudder
Happy was I;
Oh, take me to my kind old mudder!
Dere let me live and die.

One little hut among de bushes,
One dat I love,
Still sadly to my memory rushes,
No matter where I rove.
When will I see de bees a-humming
All round de comb?
When will I hear de banjo tumming
Down in my good old home?

All de world am sad and dreary,
Ebery where I roam;
Oh, darkeys, how my heart grows weary,
Far from de old folks at home.

OLD IRONSIDES

AY, tear her tattered ensign down!
Long has it waved on high,
And many an eye has danced to see
That banner in the sky;
Beneath it rung the battle shout,
And burst the cannon's roar; —
The meteor of the ocean air
Shall sweep the clouds no more.

Her deck, once red with heroes' blood,
Where knelt the vanquished foe,
When winds were hurrying o'er the flood,
And waves were white below,
No more shall feel the victor's tread,
Or know the conquered knee;
The harpies of the shore shall pluck
The eagle of the sea!

Oh, better that her shattered hulk
Should sink beneath the wave!
Her thunders shook the mighty deep,
And there should be her grave;
Nail to the mast her holy flag,
Set every threadbare sail,
And give her to the god of storms,
The lightning, and the gale!

— OLIVER WENDELL HOLMES.

A VALEDICTION

Many good-bye poems have been written in honour of dear ones who are temporarily separated from us, but none excels "A Valediction" by Elizabeth Barrett Browning.

GOD be with thee, my beloved, — God be
with thee!
Else alone thou goest forth,
Thy face unto the north,
Moor and pleassance all around thee and be-
neath thee,
Looking equal in one snow;
While I who try to reach thee,
Vainly follow, vainly follow,
With the farewell and the hollo,
And cannot reach thee so.
Alas, I can but teach thee.
God be with thee, my beloved, — God be with thee.

Can I love thee, my beloved, can I love thee?
And is this like love, to stand
With no help in my hand,
When strong as death I fain would watch
above thee?
My love-kiss can deny
No tear that falls beneath it;
Mine oath of love can swear thee
From no ill that comes near thee, —
And thou diest while I breathe it,
And I — I can but die!
May God love thee, my beloved, — may God
love thee.

MOTHER

It cannot be doubted that Lord Alfred Tennyson's own mother sat for this beautiful picture of motherhood taken from "The Princess."

ONE
Not learned, save in gracious household
ways;
Not perfect, nay, but full of tender wants;
No angel, but a dearer being, all dipt
In angel instincts, breathing Paradise,
Interpreter between the gods and man,
Who looked all native to her place, and yet
On tiptoe seemed to touch upon a sphere
Too gross to tread, and all male minds perforce
Swayed to her from their orbits as they moved,
And girdled her with music. Happy he
With such a mother! faith in womankind
Beats with his blood, and trust in all things high
Comes easy to him, and though he trip and fall
He shall not blind his soul with clay.

THE SWEETEST LIVES

Elizabeth Barrett Browning has contributed many beautiful poems to our BOOK OF POETRY but none holds a truer lesson than "The Sweetest Lives."

THE sweetest lives are those to duty wed,
Whose deeds, both great and small,
Are close-knit strands of an unbroken thread
Where love ennobles all.
The world may sound no trumpets, ring no bells;
The Book of Life the shining record tells.
Thy love shall chant its own beatitudes
After its own life-working. A child's kiss
Set on thy sighing lips shall make thee glad;
A poor man served by thee shall make thee rich;
A sick man helped by thee shall make thee
strong;
Thou shalt be served thyself by every sense
Of service which thou renderest.

NATHAN HALE

Washington needed information about the British Army. Young Captain Nathan Hale volunteered to get this. He was taken by the enemy and hanged as a spy. He died regretting that he had but one life to give for his country. The poem below was written by Francis Miles Finch.

To drum-beat and heart-beat,
A soldier marches by:
There is colour in his cheek,
There is courage in his eye,
Yet to drum-beat and heart-beat
In a moment he must die.

By starlight and moonlight,
He seeks the Briton's camp;
He hears the rustling flag,
And the armed sentry's tramp;
And the starlight and moonlight
His silent wanderings lamp.

With slow tread and still tread,
He scans the tented line;
And he counts the battery guns
By the gaunt and shadowy pine;
And his slow tread and still tread
Gives no warning sign.

The dark wave, the plumed wave,
It meets his eager glance;
And it sparkles 'neath the stars,
Like the glimmer of a lance —
A dark wave, a plumed wave,
On an emerald expanse.

A sharp clang, a steel clang,
And terror in the sound!
For the sentry, falcon-eyed,
In the camp a spy hath found;
With a sharp clang, a steel clang,
The patriot is bound.

With calm brow, steady brow,
He listens to his doom;
In his look there is no fear,
Nor a shadow-trace of gloom;
But with calm brow and steady brow
He robes him for the tomb.

In the long night, the still night,
He kneels upon the sod;
And the brutal guards withhold
E'en the solemn Word of God!
In the long night, the still night,
He walks where Christ hath trod.

'Neath the blue morn, the sunny morn,
He dies upon the tree;
And he mourns that he can lose
But one life for Liberty;
And in the blue morn, the sunny morn,
His spirit-wings are free.

But his last words, his message-words,
They burn, lest friendly eye
Should read how proud and calm
A patriot could die,
With his last words, his dying words,
A soldier's battle-cry.

From the Fame-leaf and Angel-leaf,
From monument and urn,
The sad of earth, the glad of heaven,
His tragic fate shall learn;
And on Fame-leaf and Angel-leaf
The name of HALE shall burn.

HASTE NOT! REST NOT!

"Haste Not! Rest Not!" was written by the great dramatist, Johann W. Von Goethe, who is known to the English reading public principally through the grand opera, "Faust."

WITHOUT haste! without rest!
Bind the motto to thy breast;
Bear it with thee as a spell;
Storm or sunshine, guard it well!
Heed not flowers that round thee bloom,
Bear it onward to the tomb.

Haste not! Let no thoughtless deed
Mar for aye the spirit's speed!
Ponder well, and know the right,
Onward then, with all thy might!
Haste not! years can ne'er atone
For one reckless action done.

Rest not! Life is sweeping by,
Go and dare, before you die;
Something mighty and sublime
Leave behind to conquer time!
Glorious 'tis to live for aye,
When these forms have passed away.

Haste not! rest not! calmly wait;
Meekly bear the storms of fate!
Duty be thy polar guide; —
Do the right, whate'er betide!
Haste not! rest not! conflicts past,
God shall crown thy work at last.

SONG OF MARION'S MEN

William Cullen Bryant wrote the following in memory of Marion and his brave men, who waged harassing guerilla warfare against the British army during the Revolution.

OUR band is few, but true and tried,
Our leader frank and bold;
The British soldier trembles
When Marion's name is told.
Our fortress is the good greenwood,
Our tent the cypress-tree;
We know the forest round us,
As seamen know the sea.
We know its walls of thorny vines,
Its glades of reedy grass,
Its safe and silent islands
Within the dark morass.

Woe to the English soldiery,
That little dream us near!
On them shall light at midnight
A strange and sudden fear:
When, waking to their tents on fire,
They grasp their arms in vain,
And they who stand to face us
Are beat to earth again.
And they who fly in terror deem
A mighty host behind,

And hear the tramp of thousands
Upon the hollow wind.

Then sweet the hour that brings release
From danger and from toil;
We talk the battle over,
And share the battle's spoil.
The woodland rings with laugh and shout,
As if a hunt were up,
And woodland flowers are gathered
To crown the soldier's cup.
With merry songs we mock the wind
That in the pine-top grieves,
And slumber long and sweetly
On beds of oaken leaves.

Well knows the fair and friendly moon
The band that Marion leads —
The glitter of their rifles,
The scampering of their steeds.
'Tis life to guide the fiery barb
Across the moonlight plain;
'Tis life to feel the night-wind
That lifts his tossing mane.
A moment in the British camp —
A moment — and away
Back to the pathless forest,
Before the peep of day.

Grave men there are by broad Santee,
Grave men with hoary hairs;
Their hearts are all with Marion,
For Marion are their prayers.
And lovely ladies greet our band
With kindest welcoming,
With smiles like those of summer,
And tears like those of spring.
For them we wear these trusty arms,
And lay them down no more
Till we have driven the Briton,
For ever, from our shore.

MY HEART'S IN THE HIGHLANDS

We have many poems by Robert Burns in our Book of Poetry, but none is more widely known and loved than "My Heart's in the Highlands A-Chasing the Deer."

My heart's in the Highlands, my heart is
not here;
My heart's in the Highlands a-chasing the
deer;
Chasing the wild deer, and following the
roe,
My heart's in the Highlands, wherever I go.
Farewell to the Highlands, farewell to the
North,
The birthplace of valour, the country of
worth;
Wherever I wander, wherever I rove,
The hills of the Highlands for ever I love.
Farewell to the mountains high covered
with snow;
Farewell to the straths and the green valleys
below;
Farewell to the forests and wild-hanging
woods;
Farewell to the torrents and loud-pouring
floods.

My heart's in the Highlands, my heart is
not here;
My heart's in the Highlands a-chasing the
deer;
Chasing the wild deer, and following the
roe,
My heart's in the Highlands, wherever I go.

EVENING HYMN

John Keble was an English clergyman and he wrote many beautiful poems. Among them is the "Evening Hymn," which we quote here.

SUN of my soul, thou Saviour dear,
It is not night if thou be near;
Oh, may no earth-born cloud arise
To hide thee from thy servant's eyes.

When the soft dews of kindly sleep
My weary eyelids gently steep,
Be my last thought, how sweet to rest
Forever on my Saviour's breast.

Abide with me from morn till eve,
For without thee I cannot live;
Abide with me when night is nigh,
For without thee I dare not die.

If some poor wandering child of thine
Has spurned to-day the Voice divine,
Now, Lord, the gracious work begin:
Let him no more lie down in sin.

Watch by the sick; enrich the poor
With blessings from thy boundless store;
Be every mourner's sleep to-night
Like infant's slumbers, pure and light.

Come near and bless us when we wake,
Ere through the world our way we take,
Till in the ocean of thy love
We lose ourselves in heaven above.

HYMN OF CONCORD

This poem was written by Ralph Waldo Emerson to be sung at the completion of the Concord Monument, April 19, 1836.

By the rude bridge that arched the flood,
Their flag to April's breeze unfurled,
Here once the embattled farmers stood,
And fired the shot heard round the world.

The foe long since in silence slept;
Alike the conqueror silent sleeps;
And Time the ruined bridge has swept
Down the dark stream which seaward
creeps.

On this green bank, by this soft stream,
We set to-day a votive stone;
That memory may their deed redeem,
When, like our sires, our sons are gone.

Spirit, that made those heroes dare
To die, or leave their children free,
Bid Time and Nature gently spare
The shaft we raise to them and thee.

THE REAPER

This is one of the most beautiful of the many poems by William Wordsworth. It shows how the imagination of the poet may be strangely stirred by so simple an incident as a woman reaping in the field and singing while she works.

BEHOLD her, single in the field,
Yon solitary Highland lass!
Reaping and singing by herself;
Stop here, or gently pass!
Alone she cuts and binds the grain,
And sings a melancholy strain;
O, listen! for the vale profound
Is overflowing with the sound.

No nightingale did ever chaunt
More welcome notes to weary bands
Of travellers in some shady haunt
Among Arabian sands:
No sweeter voice was ever heard
In spring-time from the cuckoo-bird,
Breaking the silence of the seas
Among the farthest Hebrides.

Will no one tell me what she sings?
Perhaps the plaintive numbers flow
For old, unhappy, far-off things,
And battles long ago:
Or is it some more humble lay,
Familiar matter of to-day?
Some natural sorrow, loss, or pain,
That has been, and may be again?

Whate'er the theme, the maiden sang
As if her song could have no ending;
I saw her singing at her work,
And o'er the sickle bending.
I listen'd till I had my fill;
And as I mounted up the hill
The music in my heart I bore
Long after it was heard no more.

CROSSING THE BAR

After Browning's "Prospice," "The Crossing of the Bar," by Alfred Tennyson, is the noblest death-song ever written. It is interesting to compare the differing emotions with which great men have faced the mystery of death, as shown forth in such poems as these and Robert Louis Stevenson's "Epitaph."

SUNSET and evening star,
And one clear call for me!
And may there be no moaning of the bar,
When I put out to sea.

But such a tide as moving seems asleep,
Too full for sound and foam,
When that which drew from out the boundless
deep
Turns again home.

Twilight and evening bell,
And after that the dark!
And may there be no sadness of farewell,
When I embark.

For tho' from out our bourne of Time and Place
The flood may bear me far,
I hope to see my Pilot face to face
When I have crossed the bar.

IN ABSENCE

ALL that thou art not, makes not up the sum
Of what thou art, beloved, unto me;
All other voices, wanting thine, are dumb;
All vision, in thine absence, vacancy.

JOHN BANISTER TABB.

THE HEATHEN CHINEE

This humorous poem by Bret Harte deals with a phase in the lives of settlers in the great western portion of our Continent.

WHICH I wish to remark—
And my language is plain—
That for ways that are dark,
And for tricks that are vain,
The heathen Chinee is peculiar,
Which the same I would rise to explain.

Ah Sin was his name,
And I shall not deny
In regard to the same
What that name might imply;
But his smile it was pensive and childlike,
As I frequent remarked to Bill Nye.

It was August the third,
And quite soft was the skies,
Which it might be inferred
That Ah Sin was likewise;
Yet he played it that day upon William
And me in a way I despise.

Which we had a small game,
And Ah Sin took a hand;
It was euchre—the same
He did not understand;
But he smiled as he sat by the table
With the smile that was childlike and bland.

Yet the cards they were stocked
In a way that I grieve,
And my feelings were shocked
At the state of Nye's sleeve,
Which was stuffed full of aces and bowers,
And the same with intent to deceive.

But the hands that were played
By that heathen Chinee,
And the points that he made
Were quite frightful to see,
Till at last he put down a right bower,
Which the same Nye had dealt unto me.

Then I looked up at Nye,
And he gazed upon me;
And he rose with a sigh,
And said: "Can this be?
We are ruined by Chinese cheap labour";
And he went for that heathen Chinee.

In the scene that ensued
I did not take a hand,
But the floor it was strewed,
Like the leaves on the strand,
With the cards that Ah Sin had been hiding
In the game "he did not understand."

In his sleeves, which were long,
He had twenty-four jacks,
Which was coming it strong,
Yet I state but the facts;
And we found on his nails, which were taper,
What is frequent in tapers—that's wax.

Which is why I remark—
And my language is plain—
That for ways that are dark,
And for tricks that are vain,
The heathen Chinee is peculiar,
Which the same I am free to maintain.

THE WALRUS AND THE CARPENTER. BY LEWIS CARROLL

THE sun was shining on the sea,
Shining with all his might ;
He did his very best to make
The billows smooth and bright—
And this was odd, because it was
The middle of the night.

The moon was shining sulkily,
Because she thought the sun
Had got no business to be there
After the day was done—
“ It’s very rude of him,” she said,
“ To come and spoil the fun ! ”

The sea was wet as wet could be,
The sands were dry as dry.
You could not see a cloud because
No cloud was in the sky ;
No birds were flying overhead—
There were no birds to fly.

The Walrus and the Carpenter
Were walking close at hand ;
They wept like anything to see
Such quantities of sand :
“ If this were only cleared away,”
They said, “ it *would* be grand ! ”



“ If seven maids with seven mops
Swept it for half a year,
Do you suppose,” the Walrus said,
“ That they could get it clear ? ”
“ I doubt it,” said the Carpenter,
And shed a bitter tear.

“ O Oysters, come and walk with us ! ”
The Walrus did beseech.
“ A pleasant walk, a pleasant talk,
Along the briny beach :
We cannot do with more than four,
To give a hand to each.”

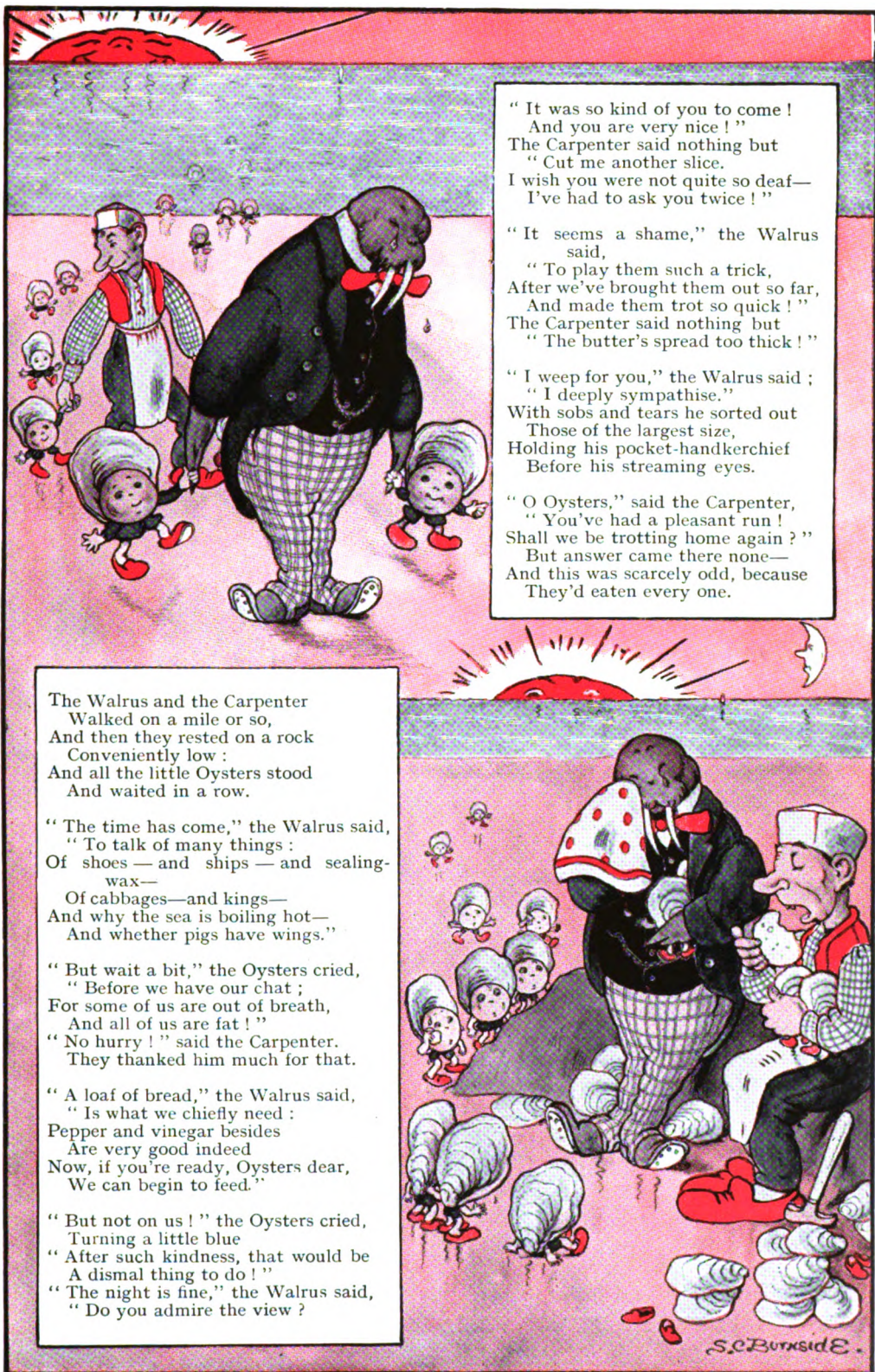
The eldest Oyster looked at him,
But never a word he said :
The eldest Oyster winked his eye,
And shook his heavy head—
Meaning to say he did not choose
To leave his oyster-bed.

But four young Oysters hurried up,
All eager for the treat :
Their coats were brushed, their faces
washed,
Their shoes were clean and neat—
And this was odd, because, you know,
They hadn’t any feet.

Four other Oysters followed them,
And yet another four ;
And thick and fast they came at last,
And more, and more, and more—
All hopping through the frothy waves,
And scrambling to the shore.



S. C. Burnside



"It was so kind of you to come!
And you are very nice!"
The Carpenter said nothing but
"Cut me another slice.
I wish you were not quite so deaf—
I've had to ask you twice!"

"It seems a shame," the Walrus
said,
"To play them such a trick,
After we've brought them out so far,
And made them trot so quick!"
The Carpenter said nothing but
"The butter's spread too thick!"

"I weep for you," the Walrus said;
"I deeply sympathise."
With sobs and tears he sorted out
Those of the largest size,
Holding his pocket-handkerchief
Before his streaming eyes.

"O Oysters," said the Carpenter,
"You've had a pleasant run!
Shall we be trotting home again?"
But answer came there none—
And this was scarcely odd, because
They'd eaten every one.

The Walrus and the Carpenter
Walked on a mile or so,
And then they rested on a rock
Conveniently low:
And all the little Oysters stood
And waited in a row.

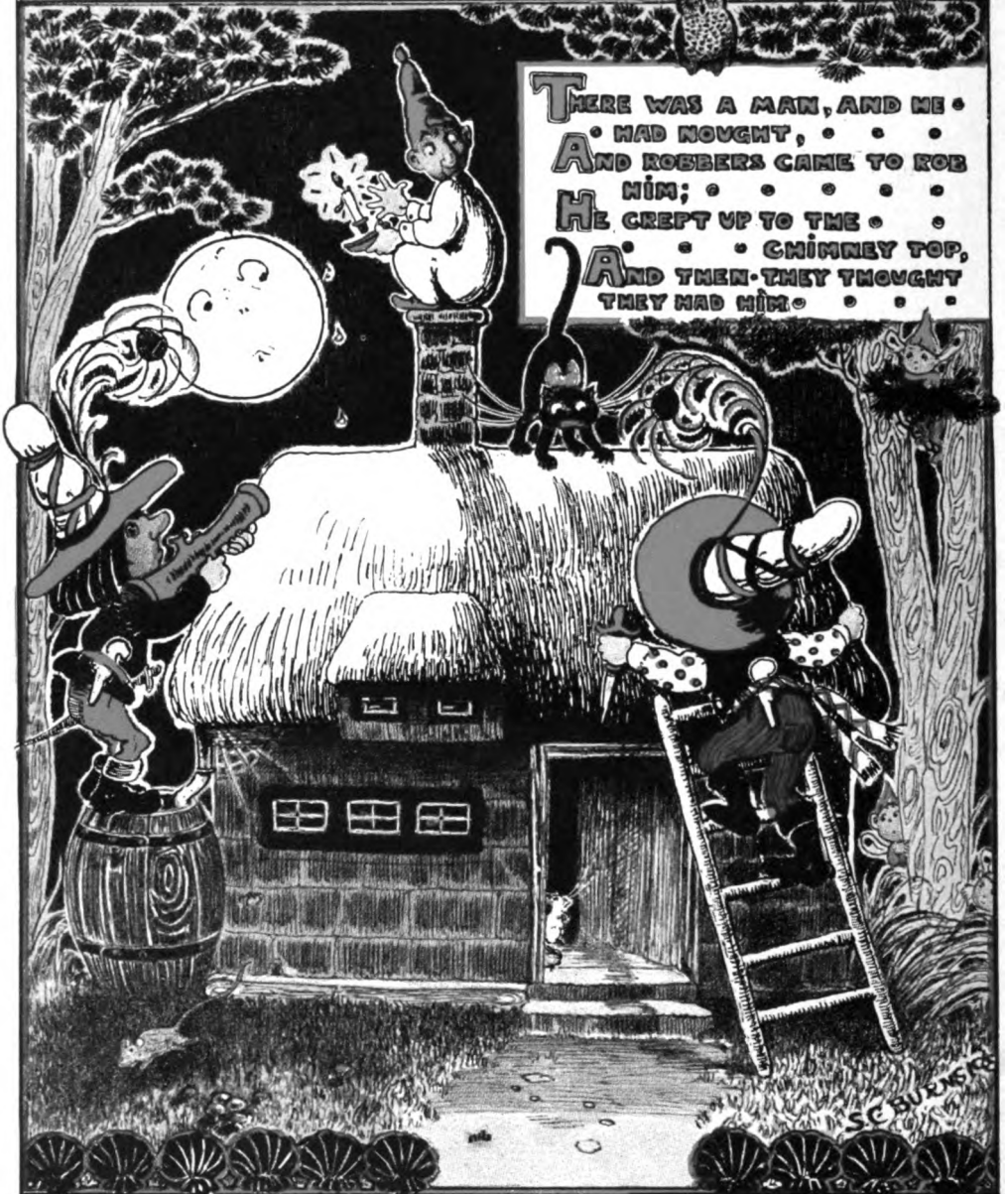
"The time has come," the Walrus said,
"To talk of many things:
Of shoes—and ships—and sealing-
wax—
Of cabbages—and kings—
And why the sea is boiling hot—
And whether pigs have wings."

"But wait a bit," the Oysters cried,
"Before we have our chat;
For some of us are out of breath,
And all of us are fat!"
"No hurry!" said the Carpenter.
They thanked him much for that.

"A loaf of bread," the Walrus said,
"Is what we chiefly need:
Pepper and vinegar besides
Are very good indeed
Now, if you're ready, Oysters dear,
We can begin to feed."

"But not on us!" the Oysters cried,
Turning a little blue
"After such kindness, that would be
A dismal thing to do!"
"The night is fine," the Walrus said,
"Do you admire the view?"

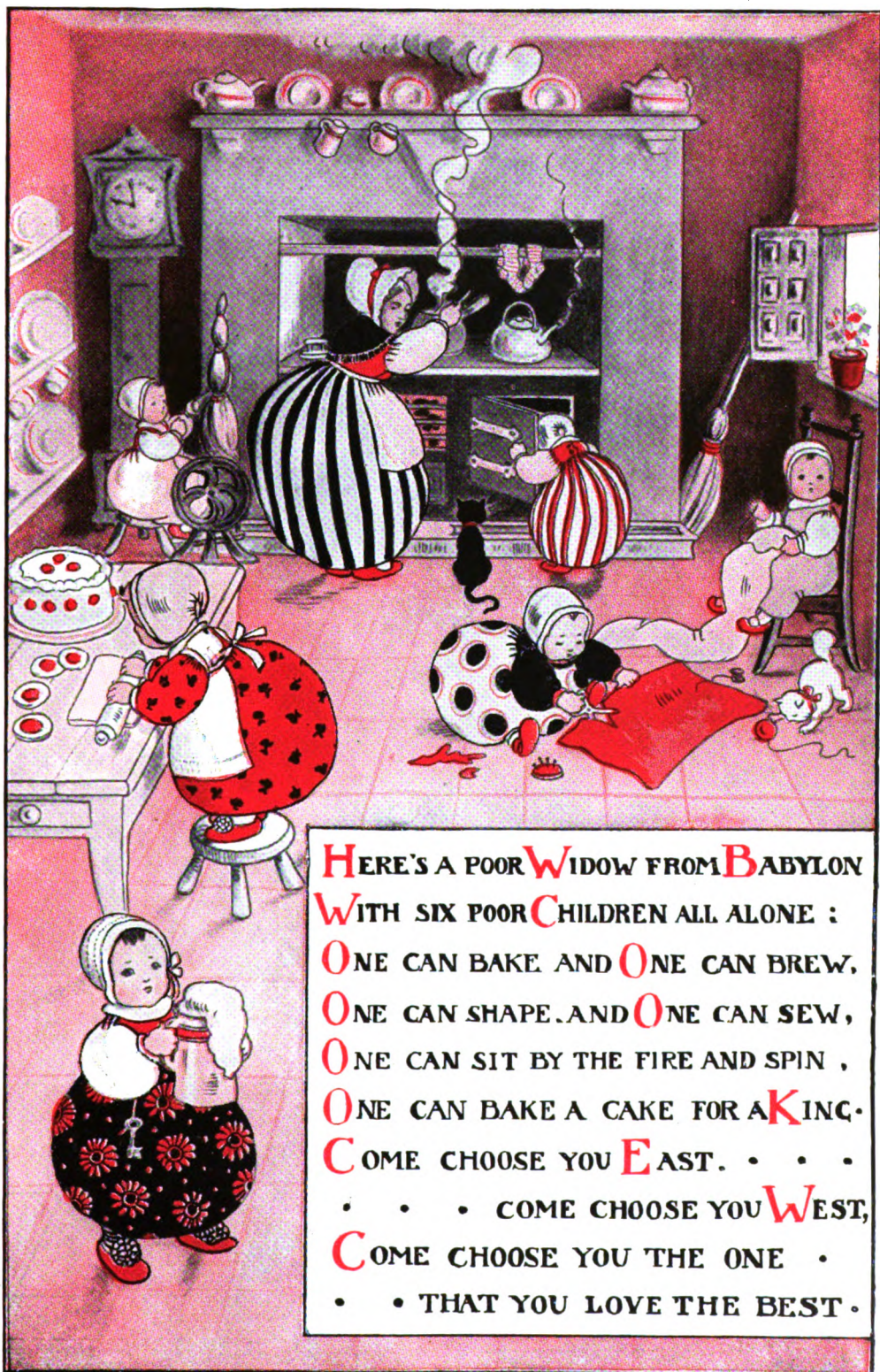
LITTLE VERSES FOR VERY LITTLE PEOPLE



THERE WAS A MAN, AND HE
HAD NOUGHT,
AND ROBBERS CAME TO ROB
HIM;
HE CLEFT UP TO THE
CHIMNEY TOP,
AND THEN THEY THOUGHT
THEY HAD HIM.

BUT HE GOT DOWN ON
T'OTHER SIDE,
AND THEN THEY COULD NOT
FIND HIM,
HE RAN FOURTEEN MILES
IN FIFTEEN DAYS,
AND NEVER LOOKED
BEHIND HIM.

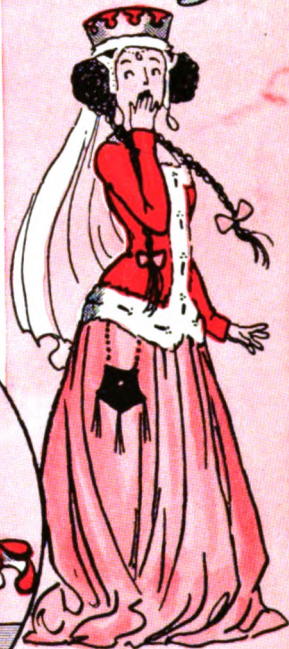
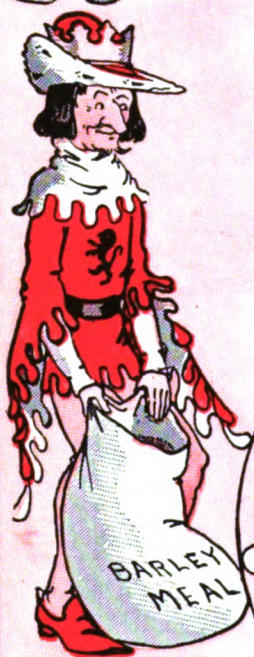




WHEN GOOD KING ARTHUR RULED THIS LAND

WHEN good King Arthur ruled this land
He was a goodly king :
He stole three pecks of barley meal,
To make a bag pudding.

A rare pudding the King did make,
And stuffed it well with plums ;
And in it put such lumps of fat,
As big as my two thumbs.



The King and Queen did eat thereof,
And noblemen beside,
And what they could not eat that night,
The Queen next morning fried.

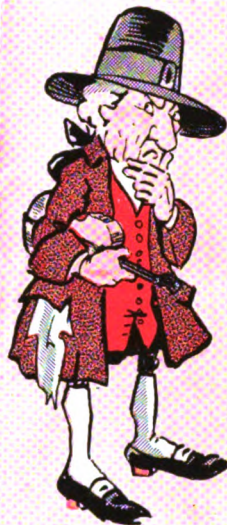
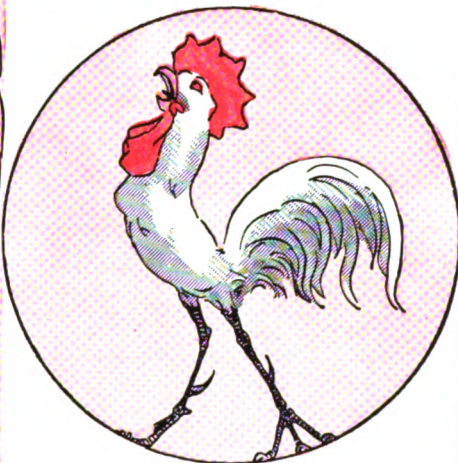


COCK A DOODLE DOO! MY DAME HAS LOST HER SHOE



Cock a doodle doo!
My dame has lost her shoe;
My master's lost his fiddling-stick,
And don't know what to do.

Cock a doodle doo!
What is my dame to do?
Till master finds his fiddling-stick,
She'll dance without her shoe.



Cock a doodle doo!
My dame has lost her shoe,
And master's found his fiddling-stick
Sing doodle doodle doo!

Cock a doodle doo!
My dame will dance with you,
While master fiddles his fiddling-stick
For dame and doodle doo.



J. J. Tonse II

FOR every evil under the sun,
There is a remedy, or there is none
If there be one, try and find it ;
If there be none, never mind it.

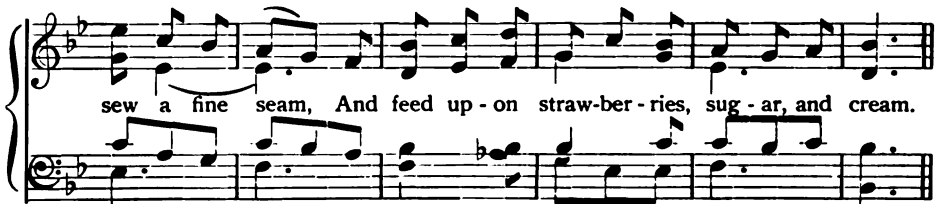
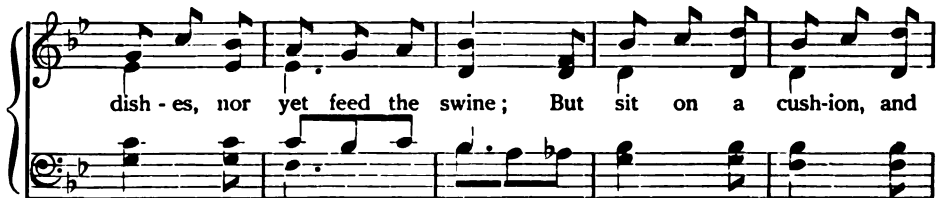
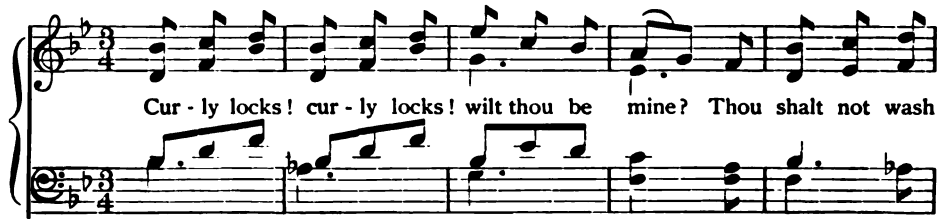
CROSS patch,
Draw the latch,
Sit by the fire and spin
Take a cup,
And drink it up,
Then call your neighbours in.

TELL tale tit,
Your tongue shall be slit ;
And all the dogs in the town
Shall have a little bit.

A SWARM of bees in May
Is worth a load of hay ;
A swarm of bees in June
Is worth a silver spoon ;
A swarm of bees in July
Is not worth a fly.



"CURLY LOCKS"



THERE was a little Rabbit sprig,
Which, being little, was not big ;
He always walked upon his feet,
And never fasted when he eat.
When from a place he ran away,
He never at that place did stay ;

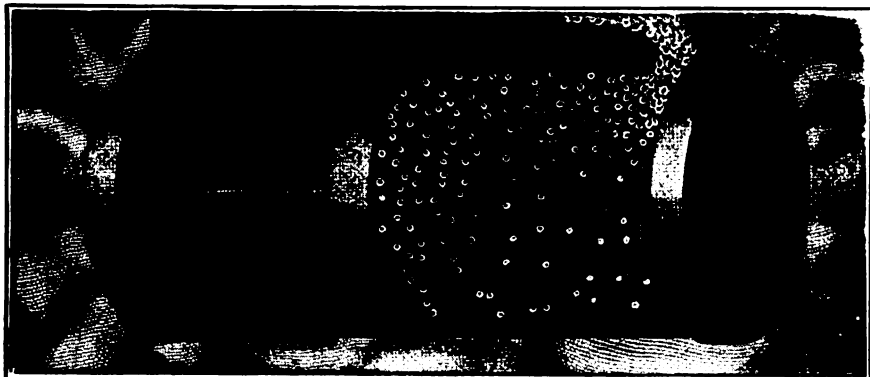
And when he ran, as I am told,
He ne'er stood still for young or old :
Tho' ne'er instructed by a cat,
He knew a mouse was not a rat.
One day, as I am certified,
He took a whim and fairly died ;
And, as I'm told, by men of sense
He never has been walking since.

BAT, bat, come under my hat,
And I'll give you a slice of bacon ;
And when I bake,
I'll give you a cake,
If I am not mistaken.

BIRCH and green holly, boys,
Birch and green holly,
If you get beaten, boys,
'Twill be your own folly.

COME when you're called,
Do what you're bid,
Shut the door after you,
Never be chid.

THE NEXT VERSES AND RHYMES ARE ON PAGE 1781



This shows how steam drives an engine. The steam is made of little specks of gas, which bombard the iron plate of the piston-rod so hard and fast that the rod moves forward and turns the wheels.

WHAT GIVES STEAM ITS POWER?

THERE is an old Scotch proverb that "mony a mickle maks a muckle," which means that many little things put together make much. The power of steam is a case of this, for it can drive great boats through the water and it can tear up the greatest rocks.

Yet all its power is due to the coming together of little units of power.

When we speak of steam, we mean water-vapour—water in the form of gas. This gas is formed under pressure, and has power to expand. It is this expansive power that does the work. Afterwards the gas becomes cool and condensed, so that we can see it, and that is what we call steam. The power of the gas is due to the tiny little molecules of water of which it is made. Each of these is flying about in all directions trying to get loose, and so striking against the sides of whatever hems it in. The force in one of these molecules is very tiny, for the amount of stuff in the molecules is so small. If you had a hammer smaller than you could see, you could not drive in a nail with it. But as there are billions of these little hammers flying about in the gas, they are able to do all the work that "steam" does.

WHAT IS THE DIFFERENCE BETWEEN HARD WATER AND SOFT WATER?

The difference between these two kinds of water is that the hard water contains certain salts not found in soft

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water. These salts are almost always salts of lime, which the water has picked up from the earth as it passed through it. So we understand that they are not found in rain-water, which is therefore soft. Hard water is very good to drink, as a rule, but the only objection to it is that it interferes with the use of soap, so that the water is not good for washing purposes.

When soap is used with hard water a chemical change occurs, so that the soap is turned into something which does not dissolve in water; whereas soap used with soft water produces something which dissolves in the water, and forms a splendid lather, and so is good for washing with. This makes a great deal of difference to poor people, or to anyone who washes clothes at home, because soap used with hard water will not lather and is very nearly all wasted, and things cannot be made clean. We can easily tell whether water is hard or soft by adding soap to it.

CAN WE MAKE HARD WATER SOFT?

If we can get nothing but hard water to wash with, it is necessary to find out some way of making it soft, and there are such ways. Very often the salt which makes the water hard is what is called bicarbonate of lime. This exactly corresponds to the bicarbonate of sodium, which is formed in

the blood, as we read in another part. Water can carry this salt about, but it cannot carry carbonate of lime, which, like carbonate of sodium, has only one "dose" of carbonic acid in it, and not two.

So the curious thing is that we can make this hard water soft by adding lime to it. What happens is simply that the new lime takes one-half of the carbonic acid from the bicarbonate, so as to form two lots of the single carbonate. The water cannot hold this, so it falls to the bottom, and after that the water is soft. Another way of making such water soft is to boil it. This drives off the second dose of carbonic acid in the bicarbonate, and the single carbonate that is left falls to the bottom, and so the water is softened. Occasionally the hardness of water is due to another lime salt which is not changed when the water is boiled. This kind of hardness is called *permanent*, while the other is called *temporary*.

ARE DIAMONDS REALLY VALUABLE?

The time will come when we are more careful than at present how we use the word "valuable." A great Englishman, John Ruskin, reminded us that "valuable" comes from a word meaning to be strong and well, and we should only use the word valuable really for things that make us strong and well and happy—for things that really serve our lives. Properly speaking, then, common iron, or still commoner air and water—without which we cannot live—are a million times more valuable than diamonds. For the only real value in diamonds is, first, that they are good for cutting glass; and, second, that they reflect light very brilliantly from their surfaces, and so are pretty.

Of course, the biggest diamond in the world is nothing like so beautiful as a rosebud or a violet; but, still, anything that reflects light brilliantly and glitters is rather pretty, especially to very small children. So diamonds are not really very valuable, but they are costly. People think these two words mean the same thing, but no one who thinks so has yet begun to be wise or to know what wisdom is. Wars are costly, but not valuable; air and light are not costly, but they are more valuable than all the jewels and gold in the world.

WHY ARE DIAMONDS COSTLY?

This is easily answered. First, diamonds are costly because they are rare. Any but the smallest diamonds are very rare indeed. They are only found in certain parts of the world, only very few of them are found there, and they take a lot of finding. Of course, there are many other rare things that are quite valueless, just as diamonds are almost valueless. But people do not want these other things, and so they are not costly. People *do* want diamonds, and so they are costly. The interesting question now is: Why do people want these things? Perhaps one person in a hundred who buys diamonds wants them because they are beautiful; he buys them for the same reason as he buys a rose or looks at the moon, or listens to beautiful singing. But many people who buy them, buy them to show that they have a lot of money.

WHY DO PEOPLE WEAR DIAMONDS?

Some people wear diamonds because diamonds are beautiful, and because they like beautiful things, but other people wear them for less worthy reasons. Of course, if one had a lot of money, one could put it into the form of a banknote for \$20,000, and wear it round one's neck. But people would say that was vulgar. Only if you buy diamonds with it, you can wear them round your neck; if it is in the morning, people will still say you are vulgar; if it is in the evening, they will say: "Look at those diamonds. What a lot of money that woman must have!" Or sometimes they say: "What a lot of money she must be worth!" They cannot say anything worse about her than that, for if she is only worth money, she is worthless. That, then, is why diamonds are costly, because they are one of the best ways of showing to all the world that you have a lot of money. Some day, when we have learnt to make diamonds as big as cocoanuts, we shall find out how many people love them because they are beautiful, as then everyone can have them who likes them. They are only made of carbon, and carbon itself is dirt cheap.

WHAT MAKES GOLD MORE VALUABLE THAN SILVER?

This is another question where we should use the word costly instead of valuable, for I am not sure that gold is really more valuable than silver. Silver

is at least as beautiful. Silver, when it has a little of something else added to it, wears better; certain forms of silver are very valuable as medicine. Gold, on the other hand, is valuable for some purposes, because it can be hammered into very thin sheets. At any rate, there is no doubt that gold is more costly than silver, and the reason is that it is very much rarer. There is probably much less of it in the world.

If, one day, we should discover a great mountain made of solid gold, then gold would become much less costly than silver; and if the mountain were very big, no doubt we should make pennies of gold. That shows the difference between cost and value, for if a thing has real value, such as noble music or wheat, then the discovery of more of it is simply so much more real wealth in the world. My loaf is worth no less to me because you have a loaf too; but the more gold there is in the world, the less can I do with the gold I have. These things are quite simple—any child can understand them—and when all grown-up people understand them the earth will be a new place.

IS GOLD POISON?

Gold is not poison to men's bodies. If you were even to swallow a gold eagle it would no doubt hurt you, but it would not poison you. But gold may be—though it need not be—a poison to men's souls. It is the love of gold, just because gold gives us the power of doing things we like, that makes most wars, for instance. It makes men cheat and thief and murder, and hate the good and love the bad. There are four lines of poetry, written by the greatest poet of all time, which I want to quote to you. They are in a play by Shakespeare. The man who speaks is very unhappy, and he has bought some poison in order to kill himself. Though it is against the law to sell poison, yet the man who has it is very poor, and he has taken Romeo's gold for it. Then Romeo says:

There is thy gold; worse poison to men's
souls,

Doing more murders in this loathsome
world,

Than these poor compounds that thou
may'st not sell:

I sell thee poison, thou hast sold me none.

There are people who will say that the answer to this question is

nonsense, but there are others, perhaps, who may think that it is worth its weight not in gold, but in life.

HOW DOES GOLD COME INTO THE EARTH?

Not so long ago people would have said, in answering this question, that the gold of the earth must have been there as gold in the stuff of which the earth was made, since it was believed that atoms of gold, like atoms of anything else, had always been as they are now from the first.

But no one would now return that answer to this question. We must believe that the gold now found in the earth has been formed there, probably very long ago, by the breaking down of some kind of atoms even larger and heavier than those of gold. No one can yet say what these atoms were, though if the question had been asked about some other elements instead of gold—such, for instance, as lead—the answer would probably be that the lead now found in the earth had been formed from the breaking down of atoms of radium. This question about the history of gold and of many other elements will probably be answered before long.

WHAT MAKES SOME THINGS SMELL AND OTHERS NOT?

We say that we smell things at a distance, but what we actually smell is always something that enters the nose, though it may have been carried from a distance. So if anything is to have a smell, first of all it must give off from itself something or other which can reach the nose; and, secondly, that something must have the power of influencing the nerves of smell. We cannot smell pure air or water even if we sniff it up the nose, because, though these things touch the ends of the nerves of smell, they have no effect on those nerves.

As a matter of fact, most things do give off something from themselves, even such things as metals; and if we put our nose very close, we may detect some smell, just as we may in wood or leather. But though many more things than we think have some smell, yet things vary very much. A little speck of the stuff called musk will give a powerful scent to a room for years—a fact which shows, among other things, what an amazing number of atoms there must be in the tiniest speck of

anything, since, after long periods of time, there seems to be just as much musk there as ever, though it has been filling the room with its scent all the time, and this means that it has been giving off atoms of itself to the air of the room.

WHY DO THINGS SMELL DIFFERENTLY?

Difference of smell depends upon the difference in the way things are made, and that is about all we can say. Still, we can, to some extent, find that there is some rule in the way things smell. For instance, very often we notice that numbers of plants belonging to a particular family of plants have odours with a family resemblance between them. Then we notice that there is a certain resemblance in the smells of a great number of different compounds, all of which contain the element sulphur. This is a very notable thing to remember about sulphur, for practically all its compounds have a disagreeable smell.

The compound of sulphur and oxygen, which is the gas made when sulphur is burnt, is very unpleasant; so is the compound of sulphur and hydrogen, H_2S , which corresponds to the compound of oxygen and hydrogen, H_2O . This sulphuretted hydrogen, as it is called, smells exactly like rotten eggs, for the very good reason that it is sulphuretted hydrogen which is formed in rotten eggs and gives them their objectionable smell.

Similarly, many plants make compounds of sulphur which have the same sort of family smell. On the other hand, there are certain oils, produced by plants, that are made of carbon and hydrogen, and are all built up on the same chemical plan. These, which we often call essences, have a certain group or family smell, though they differ very much from each other. So smell, we see, is a sort of chemical sense, and things smell differently because they differ chemically.

WHY DO TREES GROW UPWARD?

The first thing to say in answering this question is, that the whole tree does not grow up. Part of the tree grows downward and that is the root. Each grows to the place where it can do the work for which it was made. In the seed from which the tree grows, there are certain cells which are meant to form the part of the tree that is

to live in the air and the light. Wherever the light is, they grow towards it. On the other hand, there are other cells which grow best in the dark, and which even seem to be affected by the gravitation of the earth, so that they grow best towards the centre of the earth.

It is possible to play tricks with the seed, as, for instance, to turn it upside down; but the rule is that the plant will do its best, by curling round as it grows, to ensure that the *shoots* shall get into the air and the light, and the *roots* shall grow downward. So the tree—and this is true of nearly all plants—has two parts: one that lives in the air, and one that lives in the soil. Neither part could live without the other, and the tree is so made from the first that the right part of it—that which is capable of making leaves—must grow upwards into the light and air; while that part of it which will be capable of sucking up water and salts—and also of holding firm—must grow downwards into the earth.

WHY DOES A FACE IN A MIRROR SEEM CROOKED TO A PERSON STANDING BY?

We think that the two sides of our faces are just like each other, but every clever photographer knows that they are not. Ordinarily we notice nothing, but when we see anyone's face reflected in a mirror, then we see the left side of his face as if it were the right, and the right as if it were the left; and as our eye is accustomed to the other thing, his face looks crooked. If you had never seen the person before, you would notice nothing. You have never seen your own face except in a mirror, and if now it were possible for you to see your face as everyone else sees it, your face would look as crooked to you as the faces of your friends look when they are seen in a mirror. Of course, if the two sides of the face were exactly alike, the face would look just the same, whether seen in a mirror or directly.

ARE THINGS IN MID-AIR AFFECTED BY THE MOVEMENT OF THE EARTH?

Certainly they are; the air goes round with the earth, just as the seas do, and everything that is swimming in it—birds, balloons, or anything else—goes round too, just as the fishes do in the sea. If this were not so, when we went up in a balloon, the air would rush past us as it was whirled round with the earth, at the

rate of hundreds of miles an hour. It would be the highest wind we were ever in, and, as we looked down from the balloon, we should see the earth rolling past beneath us; but, of course, that does not happen. Everything in the air shares its movement, and moves with it, except in so far as it has some power of movement of its own, like an airship or that best of airships, a bird.

WHY IS THE WORLD LIGHT WHEN THE SUN IS BEHIND DARK CLOUDS?

It depends how dark the clouds are. If the moon passes directly between us and the sun, the earth becomes as dark as night because the moon is quite opaque, which means that no light can pass through it at all. But when it is only clouds that are between us and the sun, a good deal of light always gets through them, so long as they are real, clean, water clouds. Browning, the great English poet, says:

A sun will pierce

The thickest cloud earth ever stretched.

But sometimes in great cities, and especially in London, unnatural clouds are made, filled with smoke and dirt—mostly tiny specks of coal which have been sent up the chimney. These are the really dark clouds, full of solid black dirt, and there are times when they make the face of London darker than it ever is during a summer night. The coal was made by the sunlight of past ages, and when sent into the air it stops the sunlight that has travelled such a long way from the sun, so quickly and surely to serve people. It has 93,000,000 miles to come, and just at the last half mile or so it is stopped; is this not foolish? And people actually use past sunlight to stop it with!

HOW DOES A COW MAKE ITS MILK?

There are certain parts of the body which exist in order to produce things which the body needs. These are called glands, and they are the chemists of the body. Some glands also exist in order to filter out from the blood things which it does not want. Many glands in the skin do this. Other glands—like one just below and in front of the ear, which gets swollen when we have mumps—make the saliva that pours into our mouths when we eat, and helps us to soften and digest our food.

But there are certain glands which are a thousand times more beautiful and wonderful than any other because they do not exist at all to serve the body to which they belong, but they exist for the sake of other people. They show that Nature is on the side of love, and I think they also show that it is from mothers that love first sprung. When the cow has a calf, the gland called the udder, which makes milk, becomes active, and has the wonderful power of transforming the blood that passes through it into milk for the young calf. The calf's mother eats grass, and turns it into blood; and then the udder turns the blood into milk, which is the best food for calves, as indeed it is also the best food for us. If we could see the udder under the microscope, we should see the little cells near which the blood runs, taking out of the blood everything they need in order to make milk, which passes directly into the calf's stomach—pure, warm, and containing everything the calf needs for its growth.

WHY DOES A CAT ALWAYS FALL ON ITS FEET?

Of course, one answer to this question is that its feet are the best part of it to fall on, but the real puzzle for us is *how* does the cat manage to get its feet lowermost even though it be let fall when it is held by its feet. It has been argued that the cat manages to turn itself by the use of its tail. If that be so, of course, Manx cats, which have no tails, ought not to be able to fall on their feet, but they *are* able. So that that explanation will not do.

All we can say is that somehow, by moving one part of its body on another, the cat controls its fall in order to fall most safely. It is so clever of the cat that we are not yet clever enough to find out how it does it. But we do know that there was no need to call in the tail as an explanation, for men who jump from great heights or who dive from great heights into water have a good deal of power in controlling their bodies as they fall, though every now and again they make a mistake, and one of them is killed. We should not like to see such feats. And also I hope that you will not, after reading this answer, make experiments on your pussy.

WHY HAVE SHIPS A WATER-LINE?

When any ship floats in the water, the line that the surface of the water makes along the ship's side is called the water-line, and the height of this line on the ship's side will depend on the extent to which the ship is loaded. In 1868 an Englishman named Samuel Plimsoll tried to pass a bill dealing with what used to be called "coffin-ships," so called because they were unfit to go to sea, far too heavily loaded for safety, the cargo being heavily insured so that if, as often happened, they went to the bottom, though the crew lost their lives, the owner lost nothing. After a long fight, mainly due to the resistance of bad shipowners, Plimsoll got a law made that a line must be painted on an English ship, and the ship may not be loaded to such an extent as to put that line beneath the water. It is usually known as Plimsoll's line or mark, and must already have saved thousands and thousands of sailors' lives.

WHY DOES STEAM ALWAYS COME WHEN WATER IS HOT?

Water evaporates, as we say, at all temperatures. Whether hot or cold, it slowly leaks away into the air in the form of a gas. As this remains a gas, we do not see anything. But when water is made hot, it very quickly passes into the air as a gas. It passes so quickly that the air cannot hold it all, and it is so much hotter than the air, that it is cooled in the air and turned into drops of liquid water again. It is this little cloud of drops of wet water in the air that we call steam. Water vapour ought not to be called steam. The gas, or vapour, only becomes steam when it ceases to be a gas, and becomes liquid water again.

Thus the name steam-engine is really a very bad one. Steam is what we see escaping from it, but steam—that is to say, a cloud of drops of liquid water—would never drive the engine, as every engineer knows. The kind of thing that does the work he wants is what he calls "dry steam." It is not steam at all, but water vapour. When he first lights his fire, he gets what he calls wet steam—the engine is cold, and it turns the water vapour, which comes from the water as it gets hot, quickly back into steam, or wet water, again; and it is a poor business trying to run an

engine on "wet steam." But all steam is really wet, and you see that we use the word wrongly. It is not steam, but water vapour that drives a steam-engine; and the water vapour turns into steam only when its work is done and when it can do no more.

WHY DOES AN EGG GET HARD WHEN BOILED, WHILE MOST THINGS SOFTEN?

There are certain kinds of chemical compounds with a special name which really means "like glue," and when these things are heated up to a certain point, they turn firm, or stiff. They have very big molecules, each made of a large number of atoms; but we do not yet understand why they should behave in this way. One of the best examples of them is white of egg, or albumen.

Albumen means white—England is called Albion because of the white cliffs at Dover. So when an egg is heated only to the temperature of boiling water—which is not really very high, for it is nothing compared with the temperature of a flame—all the albumen of the egg turns solid. The same thing would happen to the albumen of blood, which is very like white of egg—one of the reasons why eggs are such good food. There are other things which behave in a curious way when they are heated. For instance, nearly all salts are much more easily melted in water when it is hot than when it is cold; but there is a salt of lime—the salt made when lime is combined with the acid found in lemons—which melts readily in cold water, but unmelts and appears again when the water is made hot. We do not know why this happens.

WHAT MAKES THE AIR HEAVY?

Heaviness is what we notice in any kind of matter because the earth is pulling upon it. The more the amount of matter, or stuff, in the thing, the heavier it is, because the greater is the earth's pull for it, and its pull for the earth. The air is heavy because it is matter, and all matter is heavy because it is pulled upon by the earth. We find it difficult to understand why the air should be heavy, because we find it difficult to understand that the air is a thing. We sometimes talk about "airy nothings." But the air is a thing, as you would not doubt if you saw liquid air, or solid or frozen air.

Therefore, it would be just as reasonable to ask what it is that makes a table heavy as to ask what makes the air heavy.

And one way of answering either question would be that it is the earth that makes things heavy, for if the earth were not there to pull them, they would not be heavy at all—or, rather, they would have just a little heaviness in them due to the pull of the far-away sun. But the sun, though big, is so far away, and the earth is so near, that the heaviness of things, whether air, or a table, or anything else, is almost entirely due to the earth.

IF AIR WEIGHS 15 POUNDS TO A SQUARE INCH, WHY DOES IT NOT PRESS US FLAT?

There are two answers to this question. First, many things have strength enough in themselves to resist a pressure of fifteen pounds to the square inch without being pressed flat. A piece of steel, for instance, will stand a vastly greater pressure than that. Yet it is true that a great many things, such as our own bodies, for instance, could not possibly stand a pressure of fifteen pounds to the square inch were it not for one thing.

This is that the pressure is on all sides of us. Were it not so, our bodies would certainly be pressed, if not flat, at least very much out of shape. But the air is a gas—or mixture of gases, which comes to the same thing in this case—and one of the facts about a gas is that its pressure is the same in all directions. So, whilst our head is pressed down, yet all the sides of the body are pressed in and together, so that we are not flattened out. Thus, so long as the pressure is the same on all sides, it is, in a sense, as if it were not there.

WHAT WOULD HAPPEN IF THE PRESSURE OF THE AIR WERE REMOVED?

Suppose that we find some way of taking a part of the body—say, the arm—and removing the pressure of the air from it altogether, or, at any rate, reducing it very much. Now we shall have unequal pressure on the body, and something is bound to happen. So it certainly does.

Suppose that you had a pain in your arm or in the small of your back. Sometimes the best way of relieving this pain is to take a tumbler, drop a piece of something

burning in it, and clap the tumbler on to the skin. You must take care not to burn the body, but that is quite easily avoided if you clap the tumbler on upwards instead of downwards. Then the air inside the tumbler is largely used up by the piece of burning rag or whatever it is, and the pressure inside the tumbler is very much reduced.

So it is almost as if the little circle of skin covered by the tumbler had the atmospheric pressure taken away from it, while all the rest of the body went on as before. Now we see what the atmospheric pressure can do. It is pressing on all the body except just that little circle of skin, and so it simply squeezes a lot of the body fluids into that part of skin, and it swells and swells and rises into the tumbler, until it looks very funny indeed. The air is pressing on every part of the skin except one, and that is the consequence. It does not hurt at all, though it looks as if it should, and it often relieves a deep-seated pain. Then, if you slip something under the edge of the tumbler so as to let the air in, it drops off; and now the air pressure is equal on all parts of the skin, and the swelling is smoothed out again. This way of relieving pain is called dry cupping.

IF CLOUDS ARE SOFT, WHY DO THEY MAKE A NOISE WHEN IT THUNDERS?

It is not the clouds bumping against each other that makes thunder. Certainly clouds are much too soft to make a noise when they do that. They are, indeed, too soft to bump at all, but simply mingle with each other. The thunder is due to the disturbance of the air when electricity passes from one cloud to another, or from a cloud to the earth. As it passes it makes the air near it very hot, and so starts a wave in it which we hear and call thunder.

WHY CANNOT WE HEAR WHEN WE ARE ASLEEP?

We can hear when we are asleep—if a sound is loud enough. It is only when a man is unconscious through some poison that the loudest sound will not wake him. Only when we are asleep we do not hear slight sounds. The reason of this is that in sleep the part of the brain which hears is much less sensitive than usual; and so, though soft sounds reach our ears, and affect the nerves that run from the ears to the

brain, the brain takes no notice of these messages. As to how much we require to wake us, it all depends on the depth of our sleep. It has been proved that during the earlier part of the night we require much louder sounds to wake us than towards the morning. So it is the earlier part of our sleep that is best for us, and there is good sense in calling this part of our sleep "the beauty sleep." Very often we do hear when we are asleep, but instead of the whole brain being awakened, only part of it wakens, and so we have all sorts of dreams that were really started by some noise. It is possible to whisper into a sleeper's ear and give him dreams in this way, without waking him; but this is certainly not a good thing to do.

WHY IS IT THAT STREAMS FLOW AND RIVERS DO NOT?

The answer to this is that rivers do flow. Perhaps streams often flow more quickly than rivers, because they may be running more steeply towards the sea. But the reason why you ask this question is that, as a rule, streams are shallow, and the stones and so on in their bed disturb the surface of the water. But a river is deeper, and so the surface of it seems smooth, and, unless we look very carefully, we think that it is still. If you throw upon it something that will float you will find that it is not still.

We must not be misled by the surface of things. There is a very good proverb which really answers the question; it is: "Still waters run deep." It is because the river is deep that we think it still. Of course, the real meaning of this proverb is, that in studying people we can learn from streams and rivers. There are people who babble and sparkle just as streams do, because they are shallow; and there are others who do not show much on the surface, but that may be because they are deeper people, and have more in them. So, when you are inclined to judge of such people on little acquaintance, it is well to remember the proverb that "Still waters run deep."

WHY DO MOTOR-CARS HAVE NUMBERS ON THEM?

Motor-cars have numbers on them because of a common failing in human nature. If we were all honourable and kind, if it were impossible for any of us to do harm without at once wishing to repair it as far as we could, then motor-

cars would have no numbers on them. But since motor-cars often do damage, they have to be numbered both in front and on the back, so that they may be known again. It is not that anyone blames the motor-car, which is just a piece of machinery, and neither good nor bad; but putting a number on the car comes really to the same thing as putting a number on the man who owns or drives it, so that if he does harm, and does not care, we may be able to find him out. The fact that motor-cars have numbers can do no harm to honest people who have motor-cars, for they would act just the same whether the numbers were there or not. They are put to the expense of paying for them because some other people are not honourable, and I am afraid that very often happens to honest people.

WHAT MAKES OUR HEARTS BEAT?

It would take a big book to do justice to this question. We know positively that the heart can and does beat in an independent way quite apart from the brain or the rest of the body. If a frog is killed, as, for instance, by cutting its head off instantly—which is so quickly that the frog has no time to feel any pain—then, though the frog is dead, its heart still beats, as we find if we open the body. The heart can be completely cut out of the body, and will lie beating in your hand for a long time. So will the heart of a bird or a rabbit. This proves, of course, that what starts the heart-beat is in the heart, even though we know the brain can make the heart beat faster or slower, or can even stop it.

When we examine the heart of any animal very carefully, we find that it has a large number of nerve cells in it. If we cut a heart to pieces, any part which is cut away from the nerve cells stops beating, but any part which has nerve cells in it will go on beating until, at last, the heart dies from lack of food. But it is very interesting that the heart will go on beating for so long. If we attach tubes to the heart in place of the blood-vessels, and send fluids through it containing common salt and certain other salts which help to nourish it, it will beat for hours or even days—a most wonderful thing. In this way, without causing any pain to any animal—for I am speaking only of a heart by itself, the animal it belonged to having been killed

at once—we can study the action of different things on the heart. And it has thus lately been proved that sugar is a valuable heart food, while alcohol is no food to the heart at all.

COULD A BALLOON PASS OUT OF THE RADIUS OF THE GRAVITY OF THE EARTH?

Certainly a balloon could not pass beyond the gravity of the earth, because the balloon floats in the air, and, as it goes up, the air becomes thinner and thinner, until at last it is too thin to support the balloon, and the balloon can go no higher. If anything is to pass beyond the gravity of the earth, and escape from the earth, it must have some motion in itself sufficient to carry it so far that the earth cannot pull it back again.

This must have happened to the stuff which makes the moon when it was thrown off from the earth. It used to be thought that some or all of the iron and other meteorites which are sometimes caught in the air—and which we call shooting stars—might really have been formed in the earth. This was thought because these things were found to be made of the same stuff as the earth, at a time when we did not know that all the universe is made of the same kinds of stuff. It was supposed that volcanoes might have shot up stones and so on with such force that they passed right through the air, and left the earth altogether, and then happened to be caught by it again at some later date.

We do not think that now. It is very probable, however, that certain very light gases, which—because they are light—seem to exist mainly in the upper layers of the air, may escape from the earth altogether, perhaps being thrown off from the air as drops are from a twisting umbrella. That seems to be the reason why the moon has no air, since the moon is very small, and has not strength of gravity enough to keep a gaseous envelope, such as our air is.

WHAT WOULD HAPPEN IF GRAVITATION CEASED ON THE EARTH?

If gravitation ceased on the earth, there would be an end of life as we know it. Anything thrown into the air or jumping into the air would illustrate the first law of motion, which is that any moving thing must go on moving at a constant speed in the same straight line for ever unless something stops it.

When a ball is thrown in the air, it does not seem to obey this law of motion, for the good reason, that, as it rises the earth is pulling upon it, and however strong your throw is, the earth's pull, in the long run, will stop the ball, and finally bring it back again. If the earth's gravitation ceased, the ball would rise out of sight, but even then its motion would be slowly stopped by the resistance of the air. At last the ball would stop rising altogether, *but it would not come back again*, for there would be nothing to make it do so. Even if you threw a ball down on the ground, it would bounce up, and you would never see it again.

At present we do not know the cause of gravitation. It is one of the great secrets. But we may learn it some day, and when we do, we may learn how to control gravitation, or even abolish it at will. This would be utterly different from anything we do now. No balloon does this, but merely provides something which "tells against" gravitation.

WHAT MAKES THE EARTH GO ROUND THE SUN?

There are really two questions here. If we grant that the earth is moving at all, the reason why it moves round the sun, and not in a straight line, according to the first law of motion, is that though, so to speak, it always tries to move in a straight line, the force of the sun's gravitation always turns it in towards the sun. But the other question is: What makes the earth go at all?

The sun's gravitation is certainly not the answer to this, for if the earth became still the sun would pull it into itself at once. There is some other source of the earth's motion, which was imparted to it or present in it when it was formed, and which throughout all the ages has not been done away by friction—since, as it appears, there is no friction as the earth swims through the ether. If there were any, surely by this time the earth would have been slowed down much faster and would have rushed into the sun.

This original motion with which the earth began, and which it still has, must have the same origin as the earth's twisting motion on itself, the motion through space, and the twisting motion of the other planets, and the twisting motion of the sun. We know that a

twist and move in the same direction, just as our moon does, and the moons of the other planets that have moons. For the source of all this motion, we must go back to the source of all motion and all power—back to the Author of all things. This is only to say, in other words, what used to be said long ago when it was thought that the solar system was created as it now is, each planet being “launched in its orbit from the hand of God.” Orbit comes from the Latin word *Orbita*, meaning a path.

IF WE COULD DARKEN THE SUN, HOW SOON WOULD LIGHT REACH EARTH AGAIN?

Another way of putting this question would be, how long does light take to travel from the sun to the earth? Of course, anyone who can do simple arithmetic can answer this if he knows at what rate light moves, and how far the sun is from the earth. The rate of the movement of light through the ether is well known, and it never changes. It is slightly more than 186,000 miles in every second. The sun's distance from the earth varies a little, because the earth does not move round the sun in a circle, but in an ellipse. But we may take the rough figure of 93,000,000 of miles as the distance. Now, if we divide this figure by the other, we get an answer of about 490, which is the number of seconds it takes light to travel from the sun to the earth. The answer, then, which anyone can easily remember, is *a little more than eight minutes*. If we compare this with four and a half years, which about represents the time that light takes to reach us from the nearest star, it will help us to imagine what a wonderful distance the sun and his family are from their nearest neighbour.

WHY CANNOT WE FEEL THE EARTH GOING ROUND?

The answer to this is that we are going round with the earth, and, as we are moved round with it at exactly the same rate and in exactly the same direction, we notice nothing. If you were in a train and did not look out, and the train moved at a constant speed in a straight line, and gave no jolts at all, you would not know it was moving; but, if it suddenly went more quickly or slowly, you would feel its motion. So, if the earth were suddenly to go round very quickly—say, so as to

make a day of six hours instead of twenty-four—we might feel that it was going round because our bodies might be affected, as they are when a train suddenly gives a jolt as you get in, and you find yourself in someone's lap.

The real lesson that we can learn from this question is that the only kind of movement which we can feel is relative movement—that is to say, movement of one thing as compared with another. If the earth or a train moved more slowly or more quickly than our bodies, then we should feel the movement. If we could imagine our body moving alone in space with no stars for mile-posts, then we should not know it was moving, for there would be nothing to go by—nothing to compare it with. We can feel relative motion just because there is something to compare it with. That is how we know the sun and earth are moving—by comparing them with other heavenly bodies.

WHY DO TWO SIDES OF A ROAD MEET IN THE DISTANCE?

Of course, we know that the sides of the road do not really meet, but they seem to meet. If an artist is showing us a road going away from us in a picture, he must really draw the two sides of the road towards each other, so as to give the eye the same impression that a real road does. This is a part of the study which artists call perspective—how things look when they are *seen along*, which is what the word means. Our eyes judge by the angle between things. Let us suppose that we use only one eye, to make it simpler; then, if you look at two dots, you judge of the distance between them by the width of the angle between the two lines from them to your eye. Now suppose the same two dots, the same distance apart, were much further away from the eye, then the angle between the lines is much narrower, and, in consequence, they seem much nearer together. If we imagine that the dots are taken on the sides of the road, at different distances along, then we shall see why the sides seem to meet in the distance. They do not really get nearer, but the “angular distance” between them gets smaller.

The next Questions are on page 1641.

WHAT THIS STORY TELLS US

WE find in the body of all the higher animals a wonderful pump, hollow, with tubes leading to and from it, which we call the heart. It is of different kinds in different orders of animals, but in all main points the heart of all the animals that have red blood is one and the same. We know that it beats during life, for we can feel it beating in ourselves if we have been running very hard, or if we are frightened; and if we pick up a kitten or a bird we can feel its heart beating under our fingers. It is a most astonishing thing, that, though as much as this was known for many ages—thousands of years, indeed—it was not until less than 300 years ago that we discovered what the heart really does, and how the blood moves. William Harvey, the man who made this discovery, was so great that we must learn something about him, and we can find his story in this book by turning to the index. Here we learn what Harvey discovered about the working of the heart and all that we know of it.

THE HEART—THE LIVING PUMP

THE microscope was not invented in the lifetime of William Harvey, who first found out what the heart does and how the blood moves. It was therefore impossible for him to see the tiny channels by which the blood passes between the large vessels that leave the heart and the large vessels that go back to the heart. He died in 1657, and four years later a great Italian, the fortunate man who first had a microscope to look through, saw in the lungs of the frog the tiny vessels which Harvey had to die without seeing, though they completed the proof of his discovery. To-day any of us may see, with very little trouble, the wonderful tubes that William Harvey would have given so much to see when he was making his great experiments.

These little vessels are so small that they are almost like hairs, and so they are called capillaries, from the Latin word for a hair. The large vessels which leave the heart are called arteries, and those which carry the blood back to it are called veins.

If we open an artery after death it is found to contain no blood. Arteries

CONTINUED FROM 1446

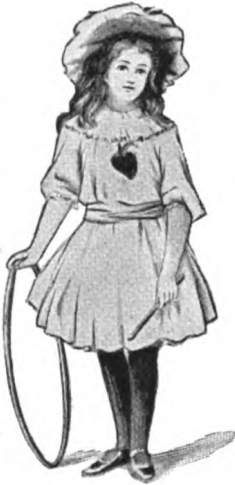


were therefore supposed to carry air, and that is what the word means, as we should see if we spelt it a little differently—airteries. This air was supposed to be the spirit or breath of the body, the real source of life.

Then a great Roman, Galen, opened an artery in a living animal, and found it full of blood. That made a stage in our knowledge.

But many hundreds of years had to pass before it progressed any further. Then a great man, Servetus, who lived in the sixteenth century, and was burnt by Calvin for not accepting his views about religion, found how the blood passes through the lungs. But it was left to Harvey to find out how it circulates through the rest of the body. This circulation of the blood is a central fact of the body's working, no matter whether we consider our own bodies or those of animals; and we must understand it. Let us begin by looking at the heart itself, to understand its working.

This, as we have said, is really a hollow pump. Its walls are made of muscle, and it is certainly the most important muscle in the body. Day and night it ceaselessly



This picture shows us the exact position of the heart and its exact size in relation to the rest of the body.

beats so long as we are alive. If it stops or falters for only a short time, we faint and fall to the ground. Its work is harder in human beings than in that of any other creature, for the part of the body which always most urgently needs blood is the brain, and in us, since we stand erect, the brain is above the heart instead of in front of it, so that the blood has to be pumped upwards by the heart. Also the heart has to beat so strongly as to send the blood down our legs with such force that it will come up them again through the veins. We know how apt our feet are to get cold, and the principal reason for this is that it is such hard work for the blood to return from them, and the circulation through them is therefore apt to get too slow. It is the warm blood that keeps the feet warm, since they produce very little heat for themselves.



This x shows the position of the pulse at the wrist. It is where the artery is just under the skin that we see it throb.

The heart lies in the upper half of the body, which we call the chest, and the chest is bounded by the long, thin bones which we call ribs. Some people have a curious way of thinking that the chest is only the front of the body, but of course it is not. The chest, or box, is in the whole of the upper half of the trunk, and it has a back as well as a front. The things that fill it are very simple to remember—a lung on each side, and the heart between them. We usually think of the heart as on the left side of the body, but, as a matter of fact, about one-third of it lies on the right side, and two-thirds on the left. If you put your hand on the front of your chest—it is best to use your right hand—then, with the tips of your fingers you can usually feel your heart beating, especially if you have been running hard, or are frightened or angry. You feel something coming up and bumping against your fingers about 80 times a minute. From 70 to 80 is the rate in grown-up people; it is rather slower in men than in women. But if you happen to be a small child your heart beats much more quickly,

and in a new-born baby it beats about twice in every second. When we are hot and feverish it beats more quickly.

Now, if you put the fingers of one hand on your wrist, you will feel something beating there, too. This is usually called the pulse. The picture shows you where to find it. If you lay the hand back downwards you can feel the pulse on the inner side of the wrist. This is a good place for feeling the pulse, because a large artery running down to the hand, as it passes over the wrist, lies just between a piece of bone and the skin, so that it can be felt easily. If while you had one hand on your heart you put the thumb of the other on the wrist of the first hand, you would find that the number of beats in both cases was the same, but you would also notice that the beat at the

wrist always came a very short time after the beat of the heart itself. It is the beating of the heart that makes the pulse, for it means that the heart is sending a wave of blood through the arteries, and since the blood takes a little time to travel, of course the beat at the wrist must be a little later than the beat at the heart itself. If you put your two hands on the two wrists of a friend you will find that his two pulses come at the same moment.



Veins like this carry the blood back to the heart. The little things like two halves of a ball are little valves like pockets, which stop the blood flowing back.

Now, we usually call the pulse at the wrist *the* pulse. But every time the heart beats it sends the blood through all the arteries, and there are several other places where we can notice a pulse. If you put your hand on your neck, as if you were going to choke yourself—only quite gently—you can feel a pulse on each side, due to the blood passing up through the great arteries of the neck on its way to the brain. If you put the tip of your finger on the side of your cheek, just in front of your ear, where you will find a little ridge of bone, which is really your cheek-bone, you will feel a pulse there, too. This artery is a branch of the great artery in the

neck, and is carrying a small supply of the blood to the scalp. But the greater part of the blood in the arteries of the neck is going inside the skull to the brain.

Lastly, you may find for yourself one other pulse which we have all noticed, though perhaps we did not know what it meant. If you cross your legs and watch the crossed foot, you will see that it gives a little jerk up and down. If at the same time you feel the pulse at your wrist, you will find that the two rates are the same, but your foot always jerks a little later than the wrist pulse. Now, that little kick is due to the fact that the great artery of the leg runs down the middle of the back of the knee in a beautifully protected fashion; but when you cross your legs you press that great artery against the hard bone of the other knee, and every time the artery swells with the pulse of blood in it, the result is that the whole leg gives a little kick. If you look at the front of your body just below your chest, when you have had a hot bath, you may very likely see the biggest pulse in the whole body; a sort of heave which is due to the great artery that runs down from the heart along the front of the spine, and among the branches of which is the artery which makes your foot kick when the legs are crossed. All these things, of course, have been noticed for many ages, but men always thought, though it is difficult to understand now how they could have thought it, that the blood went backwards and forwards to and fro on each side of the heart, instead of seeing that it went round and round.

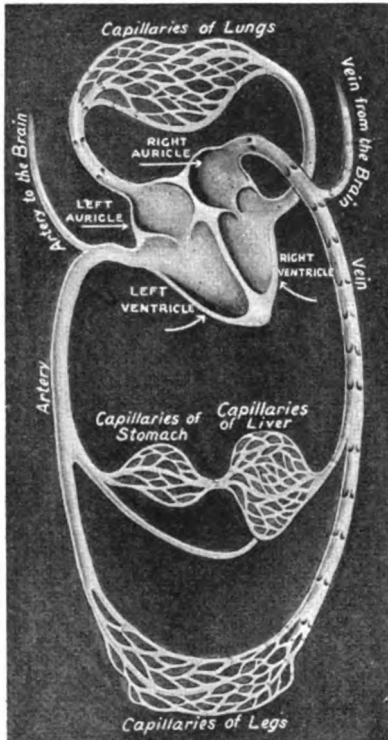
We have spoken about some of the great arteries in the body and the pulse

in them. Now let us consider the veins. These are tubes very like the arteries, but very much thinner. They can afford to be thinner, for the pressure of blood inside them is not nearly so high as it is in the arteries. Many of the veins lie on the surface of the body just under the skin so that we can see them. As we have said, the blood in them is running back to the heart. There is no pulse in the veins, because, before the blood has reached them, it has had to pass through the tiny tubes, which are the communication between arteries and veins, and there the pulse gets less noticeable, so that the blood flows upwards quite evenly through the veins.

The time may come to any one of us when there is an accident to ourselves or to someone else. An artery or a vein is cut, and the person bleeds. Now, the blood is very precious, and no one can afford to lose it. Therefore, our duty is to stop bleeding whenever we see it. It may happen to anyone who has a little bravery and a little knowledge to save a life in this way. Here are the rules.

The first does not depend upon any knowledge of the circulation, and is as simple as can be. Let us suppose that a stone has been thrown, and someone's face has been cut and is bleeding. There is a handkerchief at hand, of course, and when that is dabbed on and taken away you can usually see some point where the blood is oozing or spurting. Now, the rule, and the whole rule, is to put your finger on that point and to keep it there. This can be done in an instant, and directly it is done, no more blood can be lost until you take your finger away, and that is exactly what you are not to do. It is

HOW THE HEART PUMPS THE BLOOD



The heart is really a hollow pump, and this picture shows how it sends our blood rushing through our body. Pure blood from the lungs flows into the left auricle, which pumps it into the left ventricle, from where it flows up into the right auricle, then into the right ventricle, which sends it into the lungs.

something like the famous story of the Dutch boy who stopped the leak in the dyke where the water was coming through by thrusting his little arm into it, as told in the poem appearing on another page. Once your finger is put on, there is no immediate danger, and everyone has time to think. A doctor can be brought, or the wounded person can go to a doctor; but the first rule, which is worth all the others put together, is simply to put your finger on the bleeding point, and keep it there.

WHAT TO DO TO STOP BLEEDING WHEN AN ACCIDENT HAPPENS

Now, the other rules depend upon our knowledge of the circulation of the blood. Let us take a very common instance. There are quite large veins on the surface of the leg, and sometimes these get very stretched and swollen and weak. One of them may even give way altogether, and the blood may begin to ooze through the skin. Where there is no help at hand, a person may bleed to death in consequence of this little accident. Of course, anyone who knew the rule about putting the finger on the bleeding point, and who kept his head, would always save himself, but then most people do not learn these little rules. They are busy learning such a lot of grammar that they have not much time to learn how to save lives.

But when that rule has been followed, what else can be done? What we do will depend upon our knowledge of the circulation. The blood in this broken vein in the leg is flowing upwards towards the heart. Therefore, we must apply our pressure, let us say with a handkerchief, *below* the bleeding point.

THE TWO PUMPS OF THE HEART AND THE WORK THEY DO IN OUR BODIES

Veins have valves in them, which are so arranged as to prevent the blood from flowing back through them; but in a case such as we have described, it is sometimes necessary to apply the pressure both above and below the bleeding point, for sometimes these valves give way. Also, the valves in our veins are not arranged in the best way for a creature that walks erect; they are arranged in the way that would be best for a creature walking on all its four limbs. That is very interesting. But now let us suppose that there has been an accident, and someone is

bleeding in a different way. Let us suppose that the blood is brighter, and that instead of oozing it comes in jets or spurts. This means that an artery is bleeding, and though in any case we put our finger on the bleeding point, the next thing to be done is different, for the blood is coming from the centre, and not going back towards it, so we must apply our bandage above the bleeding point, on the side nearest the heart.

Now let us look at the heart and see exactly how it does its work. What we call the circulation of the blood is really two circulations, and the two circles meet in the heart. There is, of course, only one continuous stream, but as the blood passes along this stream, it really goes through two circles, one large and one small. There is the circulation through the lungs, the use of which we know, and there is the circulation through the body, the use of which we also know. The heart, then, is really two pumps. It has a left side and a right; the left side gets the pure blood from the lungs and sends it to the body; the right side gets the impure blood from the body and sends it to the lungs.

THE WONDERFUL WAY IN WHICH OUR HEARTS ARE MADE

The two sides are made on just the same principle, and each consists of two chambers. The upper one, which is the smaller, is called an *auricle*. It receives the blood, and then drives it into the lower chamber, which is much larger and stronger. The auricle has only thin walls, for its work is not hard—it only has to send the blood a very short distance through valves. But the *ventricles*, as the larger chambers on each side are called, are different. The right ventricle has to send the impure blood, which the right auricle has received from the body, to the lungs, and as this needs a good deal of force, the right ventricle has a fairly thick muscular coat. But the left ventricle has to send its blood throughout the entire body—brain and toes and all, and so its walls are exceedingly thick and its power is tremendous. It is much the bulkiest part of the heart, and the tip of the heart, which you feel when you put your finger on your chest, is really the tip of the left ventricle.

The picture on page 1581 will help us to understand the course of the blood.

Let us imagine that we could watch it, and let us take a drop of pure blood that has just entered the left auricle. The auricle squeezes it, like a fist squeezing something in it, and drives it into the left ventricle. When the ventricle is stretched and full, it replies by squeezing and beating in the same way, and drives the blood through the largest artery in the body, called the aorta, so that it goes to nourish every part.

THE WAY IN WHICH A DROP OF BLOOD FLOWS THROUGH YOUR VEINS

Perhaps the drop of blood we are watching stays in the aorta until the openings of many of the first branches of it are passed, and runs down the branch which goes to the left leg, and nourishes the life of the cells at the base of a toe-nail, and then starts on its long journey back again through the veins. But now, of course, it is dark and impure. It does not go straight to the lungs, however, for the force with which it was sent from the heart is now nearly exhausted. Instead of going to the lungs, it goes back to the heart itself, and so completes the larger circle of the circulation. It passes up in a great vein, which opens into the right auricle. When the auricle is full it contracts and beats, and sends the blood into the right ventricle. This contracts in its turn, and sends the blood to the lungs. It comes back from the lungs, pure and bright, by vessels which open into the left auricle—and that is where we began. We see, then, how the circulation consists of two circles joined at the heart.

We must not suppose that all the purifying of the blood is done in the lungs. Many waste matters are filtered out of it as it passes through the skin and the kidneys; also, as it passes through the body, it gets fresh food material, so that, in some respects, the blood which comes back to the right auricle from the body is better than the blood which left the left ventricle. Only it is much worse in respect of its gases, and that is why it has to be sent to the lungs.

THE LITTLE NERVE CELLS THAT START THE HEART'S BEAT

But we must ask ourselves how and why the heart is made to beat. We must think of it as a great muscle, very complicated and very different from any other muscle in the body, but still really a muscle. Now, muscles are not masters,

but servants; they are made of living cells, we know, which contract; but they never do so of themselves. Every kind of muscular tissue in the body is the servant of nerves, and does what it is told. It contracts only when a nerve orders it to do so.

We find, then, in the heart itself a large number of nerve cells, and it is these that really start the heart's beat. They are very sensitive, and very quickly affected by almost every possible influence. For instance, heat affects them very much, and the heart beats more quickly when we are hot; then all sorts of strange things in the blood affect them, such as alcohol, and the gases which enter the blood when a man smokes, and many other poisons. Some make the heart beat more quickly, some more slowly, and smoking may often make it beat irregularly.

But we must not think we have nearly finished describing the nervous government of the heart and its beating. It is far more wonderful than that. After all, the whole of the body really exists for the sake of the brain, and if the brain could not control the heart, things would soon go wrong. For instance, when we are standing or sitting upright, the work required in order to send enough blood to the brain is harder than when we are lying flat. It is therefore necessary that the heart should beat more quickly when we stand or sit than when we lie, and so it does. But this can only be done through the brain giving orders.

THE TWO SETS OF NERVES THAT RUN FROM THE BRAIN TO THE HEART

So we find that two sets of nerves run from the brain to the heart. For convenience we may just call them two nerves. These control the nerve cells that belong to the heart itself. When an order is sent down through one of these nerves, the heart beats more strongly and quickly. When an order is sent down through the other, it beats less strongly and less quickly. From moment to moment throughout the whole of our lives, the brain is thus able to control the beating of the heart. We know exactly the cells that do this work.

There is another most important fact about the circulation which teaches us again how marvellously the brain controls the body. If we examine the wall of an artery, we find it very beautifully

and wonderfully made. It has a firm outer coat, and a perfectly smooth inner coat; and between these two there are a great number of elastic fibres, so that the artery can be stretched when the heart sends a pulse of blood through it, and then spring back to its former size. But there is also a great quantity of muscular tissue in the wall of every artery. Every fibre of this muscular tissue in the arteries of the whole body is governed by nerves, and acts on the orders which they send, and all these nerves spring from, and carry messages from, a small group of cells in the brain lying quite close to the cells that govern the heart.

THE NERVE MESSENGERS THAT CARRY THE BRAIN'S ORDERS THROUGH THE BODY

Now, the extent to which the muscular tissue of an artery is contracted decides its size, and this decides the amount of blood that will go to the part of the body which the artery supplies. Hence, there is not a single part of the body that has not its supply of blood regulated by the brain. When we examine it further, we find that, just as in the case of the heart, there are two sets of nerves—one to carry messages ordering the blood-vessels to contract, the other to carry messages ordering them to relax.

In almost every part of the body these changes are going on as they are needed. Usually a message is sent by the part of the body in question up to the brain—perhaps a message for more blood, and perhaps a message for less blood. When we go out on a very cold day, the nose needs a large quantity of blood in order to warm the cold air that passes through it on its way to the lungs. It sends a message to the brain, and the blood-vessels in the lining of the nose are all ordered to relax, so that large quantities of warm blood rush quickly through the nose, and warm the air we breathe. Sometimes the message may be of a different kind, and perhaps it may be impossible to see its use. For instance, in the act of blushing, a message is sent from the brain to the arteries which supply the face and neck, so that they become relaxed, and a flood of blood surges through the skin.

YOUR BODY IS A LIVING MACHINE, UNDER THE COMMAND OF LIFE

What we must remember, then, is that though the body is a machine, yet it is a living machine, alive and under the

command of life. We can hardly think of anything more wonderful than the circulation of the blood, with its power of adapting itself from moment to moment to the needs of the body. The instances we have noticed are quite good ones, but there is another which is the most beautiful of all.

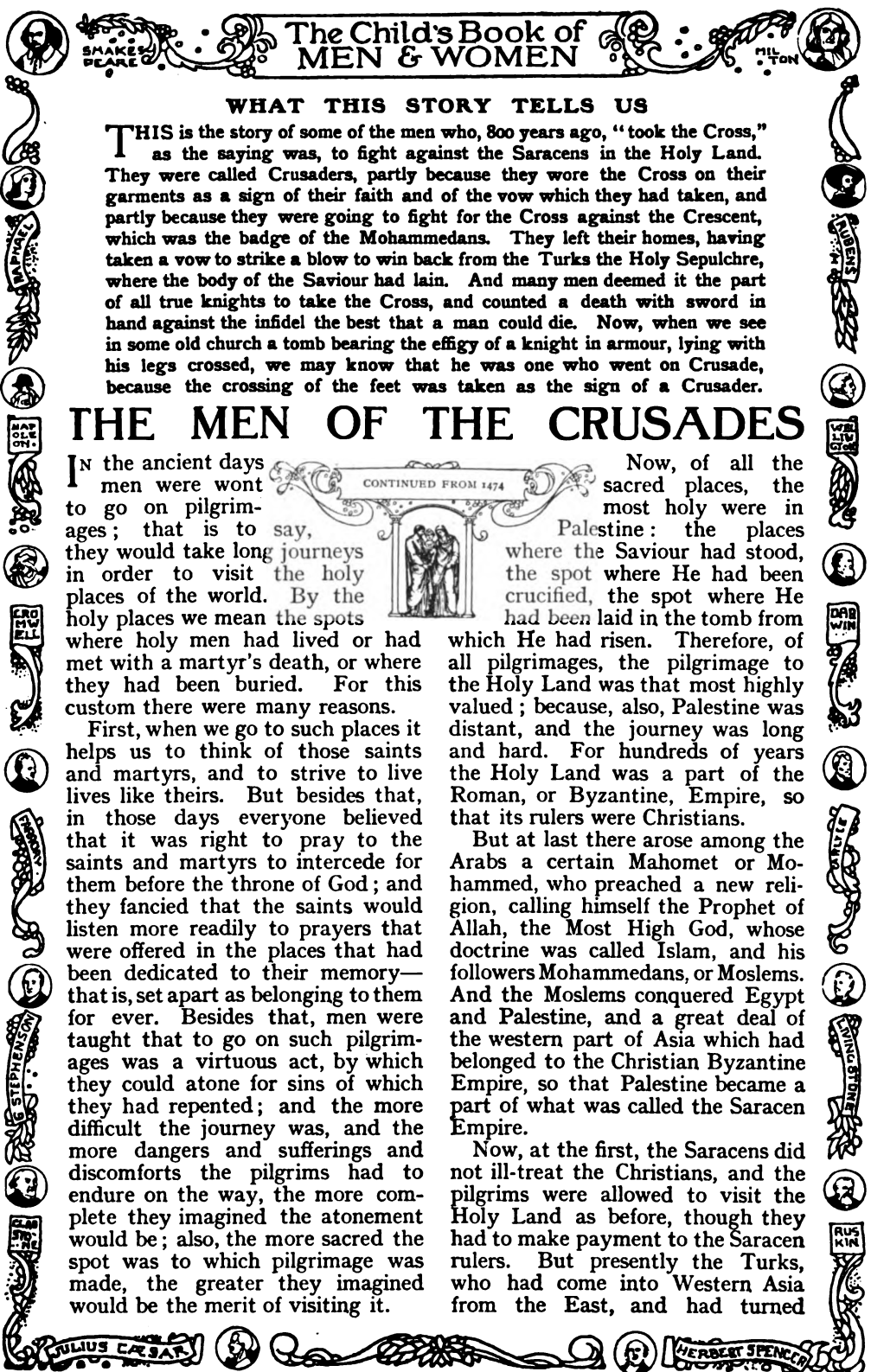
When we think, the brain requires more blood. Suppose, then, that we take a man and lay him flat on a delicately balanced table, and place him so that the table lies quite flat and not tilted up at either end. Then, when we have got this right, let us give him a difficult sum to do in his head. No sooner has he begun to work it out than the end of the table where his head is begins to fall. The reason is that the blood has become heavier and weighs down that end of the table.

THE LITTLE TUBE WALLS THAT LET THE GASES PASS IN AND OUT OF THE BLOOD

Now, there is one other thing that we must clearly understand about the circulation. We have got the idea of the blood streaming round in a system of closed tubes; but, of course, if the walls of the tubes let nothing through them, the circulation would be of no use, and we have already learned that they let gases through them. The arteries themselves are too thick for this, and so are the veins. It is the tiny tubes, or capillaries, which consist of only a single layer of very thin cells, that allow the gases to pass in and out of the blood.

That is what happens in the lungs. But throughout all the rest of the body, while carbonic acid is passing inwards through the capillaries from the tissues, all sorts of food supplies are soaking out through the walls of the capillaries into the tissues for them to live on, while all sorts of poisonous things which the tissues have been making soak back into the capillaries, and are carried through the veins to the heart. But the opposite happens when the blood visits the kidneys, for thousands of capillaries in the kidneys are specially arranged close to little tubes lined with special cells that have the power of picking out all these waste products from the blood, and so getting rid of them. Thus, the blood in the veins from the kidneys is purer than the blood in the arteries going to the kidneys.

The next part of this is on page 1633.



WHAT THIS STORY TELLS US

THIS is the story of some of the men who, 800 years ago, "took the Cross," as the saying was, to fight against the Saracens in the Holy Land. They were called Crusaders, partly because they wore the Cross on their garments as a sign of their faith and of the vow which they had taken, and partly because they were going to fight for the Cross against the Crescent, which was the badge of the Mohammedans. They left their homes, having taken a vow to strike a blow to win back from the Turks the Holy Sepulchre, where the body of the Saviour had lain. And many men deemed it the part of all true knights to take the Cross, and counted a death with sword in hand against the infidel the best that a man could die. Now, when we see in some old church a tomb bearing the effigy of a knight in armour, lying with his legs crossed, we may know that he was one who went on Crusade, because the crossing of the feet was taken as the sign of a Crusader.

THE MEN OF THE CRUSADES

IN the ancient days men were wont to go on pilgrimages; that is to say, they would take long journeys in order to visit the holy places of the world. By the holy places we mean the spots where holy men had lived or had met with a martyr's death, or where they had been buried. For this custom there were many reasons.

First, when we go to such places it helps us to think of those saints and martyrs, and to strive to live lives like theirs. But besides that, in those days everyone believed that it was right to pray to the saints and martyrs to intercede for them before the throne of God; and they fancied that the saints would listen more readily to prayers that were offered in the places that had been dedicated to their memory—that is, set apart as belonging to them for ever. Besides that, men were taught that to go on such pilgrimages was a virtuous act, by which they could atone for sins of which they had repented; and the more difficult the journey was, and the more dangers and sufferings and discomforts the pilgrims had to endure on the way, the more complete they imagined the atonement would be; also, the more sacred the spot was to which pilgrimage was made, the greater they imagined would be the merit of visiting it.

CONTINUED FROM 1474



Now, of all the sacred places, the most holy were in Palestine: the places where the Saviour had stood, the spot where He had been crucified, the spot where He had been laid in the tomb from which He had risen. Therefore, of all pilgrimages, the pilgrimage to the Holy Land was that most highly valued; because, also, Palestine was distant, and the journey was long and hard. For hundreds of years the Holy Land was a part of the Roman, or Byzantine, Empire, so that its rulers were Christians.

But at last there arose among the Arabs a certain Mahomet or Mohammed, who preached a new religion, calling himself the Prophet of Allah, the Most High God, whose doctrine was called Islam, and his followers Mohammedans, or Moslems. And the Moslems conquered Egypt and Palestine, and a great deal of the western part of Asia which had belonged to the Christian Byzantine Empire, so that Palestine became a part of what was called the Saracen Empire.

Now, at the first, the Saracens did not ill-treat the Christians, and the pilgrims were allowed to visit the Holy Land as before, though they had to make payment to the Saracen rulers. But presently the Turks, who had come into Western Asia from the East, and had turned

Mohammedans, became the most powerful of all the races who dwelt in the Saracen Empire; and when they got the government of Palestine into their own hands, they began to treat the Christians with great cruelty, so that it seemed likely enough that the pilgrims who went to the holy places would, in very deed, lose their lives and even become martyrs themselves.

THE MEN WHO CALLED UPON THE PEOPLE TO MAKE A HOLY WAR

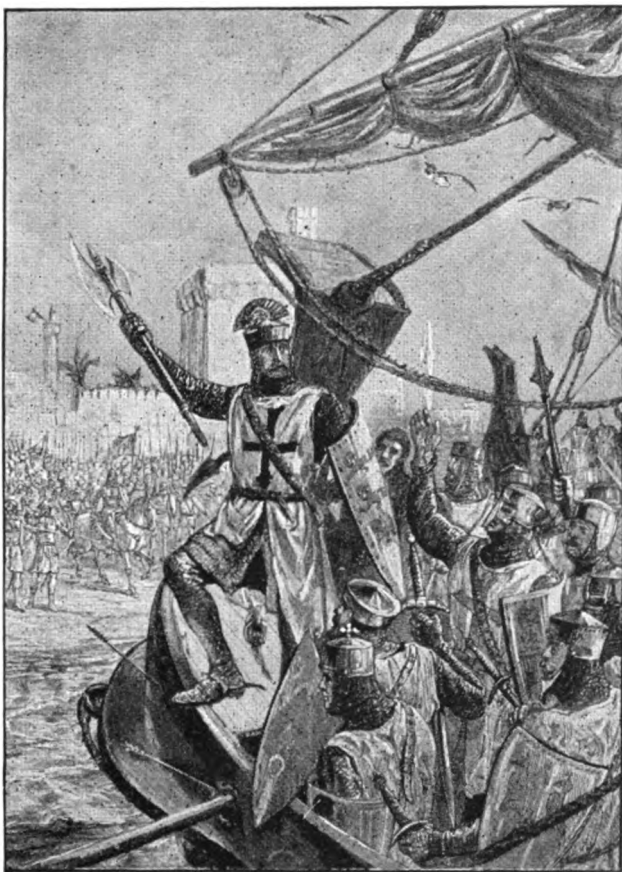
Even before this, there had been some to whom it seemed a shameful thing that the land where Jesus had lived should be in the hands of unbelievers, although so long as they did not treat their Christian subjects harshly, and left the pilgrims in peace, the nations of the West were not minded to go to war with them just to help the Emperor at Byzantium to win back lands which he had lost. But now there came a change; and first the great Pope, Gregory VII., tried to persuade the peoples of Christendom to unite in trying to restore a Christian dominion in the Holy Land.

Pope Gregory failed. But after him there came a Pope named Urban II., who was exceedingly zealous in the matter; and to his aid came a man who was a most eloquent and fervid preacher, who was called Peter the Hermit. This Peter had been himself to the Holy Land, and with his own eyes had seen the cruelties that the Turks inflicted on the pilgrims; and he came back with his heart hot within him, and told the Pope what things he had seen. And Urban bade him go forth and preach of these things. So he went to the great cities, riding upon an ass, and carrying before him a great crucifix; and his preaching stirred the hearts of all who heard him; and great crowds gathered to listen to his words, which

burned like fire. When he told them that now they might do a great work for Christ by going to rescue His sepulchre from the heathen, winning thereby pardon for all their sins and everlasting salvation, a passion of enthusiasm took hold of them. Then Urban summoned a great council of bishops and princes and nobles to meet and make an end of their quarrels among themselves, and to take counsel how the holy places might be won back from the Turks; so that a great multitude gathered at Clermont, which was the place of meeting. And after the great people had taken counsel and agreed together, Pope Urban went out and preached to the vast crowd, urging them to take the Cross and to join the Holy War; and, when he had finished, all the people cried out as with one voice: "It is the will of God! It is



Pope Urban the Second is here rousing the people for the First Crusade. He summoned a council of bishops, princes, and nobles at Clermont, and preached to them and their followers, urging them to join a Holy War. When he had finished they cried: "It is the will of God! It is the will of God!"



Richard the Lion-Hearted was the strongest knight and the most fearless fighter of his time. He led a large army to the Holy Land and captured Acre from the Turks. Here we see him at the prow of his ship, entering Joppa. He fought and won many victories over Saladin, the great Saracen chief.

the will of God!" Now, many nobles and many knights pledged themselves to join the army of Christendom which was to be gathered for the recovery of the Holy Sepulchre, under the leadership of Raymond, the great Count of Toulouse. But long before the army could be ready, and much preparation was necessary, there was a host of eager people clamouring that Peter the Hermit should lead them against the Paynim without delay; and, since they needs must have a soldier at their head as well as a hermit, they chose a knight who was called Walter the Penniless.

The Crusaders set forth, being, indeed, no more than a vast rabble of ignorant folk, without order or discipline, who deemed that since they were journeying to the Holy Land, they

might do what they would by the way. And they did so much ill that wherever they went the peoples rose up against them in self-defence; and, of all that rabble, not one out of every ten ever reached even Asia at all. But, being there, the Saracens found it no hard task to destroy them utterly, save a very few, including Peter, who escaped back to Byzantium, which was another name for Constantinople. However, the army which the princes and nobles were gathering fared in different sort. In that company were many famous warriors; Raymond of Toulouse, a baron whose power was greater than that of many kings; Tancred, the flower of knighthood, of whom in years to come the famous Italian poet Tasso sang; Godfrey of Bouillon, noblest of them all, with his brothers Baldwin and Eustace of Boulogne; Bohemund of Tarentum, a Norman knight, whose father, Robert Guiscard, had

carved himself a kingdom in southern Italy; Robert Duke of Normandy, William the Conqueror's eldest son, whose brother, William Rufus, was king of England. So that he might have gold to equip his troops for the great enterprise, Robert gave his dukedom to the "Red King" in pledge, receiving from him a sum of money.

DUKE ROBERT, WHO WAS HELD CAPTIVE BY HIS BROTHER FOR TWENTY YEARS

A very valiant knight was Duke Robert, but not over wise; easily outwitted by fierce William and his craftier younger brother who became the King Henry I., by whom, in after years, he was taken prisoner in battle, and held a captive in Cardiff Castle for twenty years until he died. Men said, though it may not be true, that the king had the luckless duke's eyes put out.

The way to Asia lay through the lands of the Byzantine Empire, where the emperor ruled at Constantinople; and little liking had he for the great host which was marching, not to win back his lost lands for him, but to drive out the Turks and set up a new Christian kingdom. But glad he was when the last of them had crossed the straits called the Bosphorus, and stood on the soil of Asia. And then they had a long way to march before them, and many fierce battles with the Turks before they could reach Jerusalem.

THE CRUSADERS FALL ON THEIR KNEES BEFORE JERUSALEM

Of these fights the fiercest was the long struggle at the city of Antioch, which the Crusaders held it needful to seize. Yet the Crusaders were unskilled in the art of sieges, and the Turks held the city stoutly. The siege lasted long; and, throughout, the boldest deeds were those of Godfrey of Bouillon and the Norman Robert. At last, however, a traitor within the gates made a plan to let in Bohemund of Tarentum with his knights; and so the town was taken. But still the citadel held out, and new armies came to help the Turks; so that the besiegers of the citadel were themselves besieged within the city. At last, however, the Christians sallied forth, and there was a great battle, which the Christians won; and after that the citadel itself surrendered. There Bohemund remained as lord. But the army of the Crusaders went on to Jerusalem itself.

Now, when they came in sight of the Holy City, the Crusaders fell on their knees, offering thanks that at length they had been permitted to behold what they had longed for; and so made ready for the assault, since the city was very strong.

HOW THE CRUSADERS SWEPT THE TURKS BEFORE THEM AND WON JERUSALEM

But on the first day, in spite of the fury of their attack, they were beaten back; whereby they learned that valour alone, lacking skill, would never gain them an entry. Therefore, they built engines of war for the storming of strong places, battering rams, and catapults for hurling great stones, as gunpowder had not at that time been invented. At last, after many days, during which they had suffered much from

thirst, the assault was renewed. All one day they fought, and still the Saracens beat them back; but again they attacked in the morning. Now while the battle raged, Godfrey saw on Mount Olivet a knight who waved a glittering shield; and he cried out "Behold! St. George is come to aid us!" At that inspiring word, the Christians were filled with a new strength, and rushed upon the Saracens; and this time they carried the rampart. The first on the top was Letold of Tournay, and the third was Godfrey. Then they swept the Turks before them; and Jerusalem was won.

Very fierce and cruel was the slaughter, and very few were they who sought to save the lives of the conquered, except Tancred; for men felt that they were right to slay and spare not, as in ancient days the Israelites had slain the Canaanites. But after the slaughter all went to pray, and to humble themselves at the Holy Sepulchre; and after that they did honour to the hermit, Peter, who had first roused them to the great enterprise, of whom thereafter we hear no more.

GODFREY OF BOUILLON, WHO MIGHT HAVE BEEN KING OF JERUSALEM

And then, when the chiefs had taken counsel together, they offered the crown of the kingdom of Jerusalem to Godfrey of Bouillon, the worthiest, though they would have been willing to give it to Duke Robert had he been willing to take it; and many to whom others had no will to give it were willing to take it. But Godfrey himself would in no wise wear an earthly crown in that city, where the King of Heaven had worn the crown of thorns, and so he called himself only the Baron and Defender of the Holy Sepulchre. Then Godfrey abode at Jerusalem, scattering the Saracens who came against him; and a year later he died, having just made good laws for the new kingdom. A wise man, valiant and just, honourable, who feared God but none other, was Godfrey of Bouillon.

To other knights were given other lordships, as Antioch to Bohemund, in whose absence Tancred ruled wisely and well, and Edessa to Baldwin, the brother of Godfrey; and this Baldwin was made king of Jerusalem when Godfrey died. Baldwin reigned for eighteen years; and after him came

another Baldwin, not his son, but a kinsman. These two Baldwins brought more lands and cities under their dominion, which was known as the "Latin Kingdom"; and one of these cities was the famous Tyre. In those days were founded the two great Orders of the Knights Templars and the Knights Hospitallers, or Knights of St. John, who were vowed to fight as soldiers of the Cross, yet to remain poor and unwedded, like monks, among whom were many very valiant soldiers. After Baldwin II. came Fulk of Anjou, and after him his son Baldwin III., in whose time the Turks won back Edessa.

Now, many pilgrims had come to Jerusalem, and many knights had come to Palestine to fight on behalf of the Christian kingdom against the Paynim, as the infidels were called; and these, too, were called Crusaders, or champions of the Cross. But because of the fall of Edessa, another great army was formed to march against the Saracens; and this is called the Second Crusade.

ST. BERNARD, AND HOW HE STARTED THE SECOND CRUSADE

This time the man who roused the princes of Christendom to the war was Bernard of Clairvaux, who is called St. Bernard, a man learned and eloquent, and of a fiery zeal. But though Conrad, the German emperor, and Louis VII., the French king, took part in this Crusade, and a vast host with them, yet it came to no good end, by reason of divided counsels, and, what was worse, of treachery.

Being jealous of each other, some of the great lords wilfully gave evil advice, so that when the crusading army came to battle with the Saracens they were defeated. But, as for Bernard, he held that the army had been defeated because the Crusaders had not marched with a single eye to the honour of God, and therefore God had not given them the victory. In this Bernard judged wisely. It may be that, if he himself had gone with the Crusaders to encourage them, a nobler spirit would have possessed them.

Nevertheless, though this Crusade came to nought and Edessa was lost, the young King Baldwin of Jerusalem held his own against the Turks, and

even won the city of Askalon. But now evil days were in store; for there rose up in Egypt, which was ruled by the Saracens, a young man whom the Christians called Saladin, who, being just appointed vizier, or chief minister, by the Sultan of Egypt, presently made himself master not only of Egypt, but also of Syria. And all men agree in speaking the praises of this Saladin as a wise and just ruler, and a very valiant and courteous knight, for all he was no Christian, but a Moslem.

THE MERCY OF SALADIN, THE EMPEROR WHO WENT UP AGAINST JERUSALEM

And, indeed, not Saladin only, but other great leaders of the Saracens had shown that they could match the best of the Christians in true chivalry and gentleness. But while Saladin waxed strong, Baldwin died, and two more Baldwins after him. And one, Guy of Lusignan, became king of Jerusalem. But now Saladin was minded to win back Palestine; and he went up against the King of Jerusalem with a great army and overthrew him at Tiberias, and took him prisoner. Then, one after another, the cities of Palestine surrendered to him, save Tyre, where Conrad of Montferrat defied him, and Jerusalem itself. But to Jerusalem he offered very generous terms if the people would surrender; and though at first they would not, yet, after a short while, when he promised to show the people mercy, and do nothing more, Jerusalem, too, surrendered.

And even so the mercy of Saladin was far more generous than the mercilessness of the Crusaders when they won the Holy City, Jerusalem.

THE THIRD CRUSADE, IN WHICH PRINCES AND KINGS MARCHED TO THE HOLY LAND

But when the peoples of Western Christendom heard that Jerusalem was once more in the hands of the Turks, a third great Crusade was resolved on, wherein princes and kings took part, and chief of them Philip Augustus, the young king of France, and Richard, the heir to the throne of England, who became King Richard I. while preparation was yet being made; and because Richard was the strongest knight and the most fearless fighter living, men called him Richard Cœur-de-Lion, or Lion-Heart. Yet even more renowned and mighty than the kings of England

and France was the German Emperor Frederick, who was called Barbarossa because of his red beard.

While the other kings and nobles were settling their own quarrels, or making preparation for this third Crusade, Barbarossa marched by land at the head of a mighty army past Constantinople into Asia, and it seemed likely enough that Saladin would meet more than his match. But Barbarossa died suddenly, whether he was drowned, as some say, in crossing a river, or from a sharp sickness caught from bathing therein; and the most part of his army perished miserably, though a part reached Antioch and conquered it again.

But now, while Richard Lion-Heart still tarried in Sicily, Philip of France and most of the army came by sea to Palestine, and sat down to besiege the fortress of Acre, where Richard presently found them, more intent on a quarrel whether Conrad of Montferrat or Guy of Lusignan should be king of Jerusalem than on war with the Saracens.

HOW RICHARD THE LION-HEARTED HID HIS FACE BEFORE JERUSALEM

Now, although the Christian kings and nobles ranged themselves on the side of Guy or of Conrad, Philip supporting the one, and Richard the other, and though each of them sought to thwart his neighbour, and the whole camp was full of feuds and jealousies, yet chiefly through the prowess of Richard, Acre was captured. Nevertheless, there were bitter quarrels between King Richard and the wily French king, and also the Austrian Duke Leopold, whom Richard treated with open scorn, for which he paid dearly enough later. But after the fall of Acre, Philip and Leopold and many others deemed that they had fulfilled their vow as Crusaders, and betook themselves home again; but Richard remained, being full of zeal to win back Jerusalem.

Yet this was not to be; for now the Crusading army was but small, and the hosts of Saladin outnumbered them many times. And so, though the King of England marched against Jerusalem, he knew, before he reached it, that the attempt must be in vain. Therefore, when he came within sight of it, he hid his face, as one unworthy to behold the Holy City, which he could not

rescue, and turned back again. Yet, whenever he came to battle with the Saracens, he wrought such mighty deeds of valour that he won from Saladin terms for a truce, hoping that he might yet return and do battle for the Holy Sepulchre.

HOW RICHARD WAS SLAIN BY AN ARROW, & THE CRUSADERS WENT FORTH AGAIN

Yet this, too, was denied him, for on his way to England, travelling alone, he fell into the hands of his enemy, Leopold of Austria, and was held prisoner for a long time before he was ransomed at a great price; and not long afterwards he was slain by an arrow in some small war.

But men tell of the high honour in which he and the Sultan Saladin held each other; and how, for many a long year, the Saracen mothers would frighten their children when they were naughty with the name of Richard Lion-Heart.

Now, less than a hundred years had passed since Godfrey of Bouillon and the warriors of the First Crusade had won back Jerusalem from the Turks and set up the Latin kingdom. Yet Saladin had in truth overthrown the Latin kingdom for good and all, though still the name of it was kept up. But still, for a hundred years more, Crusades were undertaken from time to time, though, because the princes of Western Christendom would never unite together loyally, the Moslem still held Jerusalem, and Christendom never won it back.

Of the men who went upon the fourth and fifth Crusades there is nothing good to tell; and as for the fifth, it was turned not against the Paynim at all, but against the Christian empire of Byzantium.

THE SHAMEFUL AND PITIFUL TALE OF THE CHILDREN'S CRUSADE

There is another story about the Crusades which does not really belong to our Book of Men and Women, for it tells of a multitude of children who were allowed to set out on a Crusade of their own. We must suppose that their parents let them go, believing that God would work a miracle on their behalf. Yet the Bible does not tell us that if people do a very foolish thing, God will save them from the consequences of their folly by a miracle. At any rate, a vast number of children were suffered to gather together in France, and to march down to the sea

THE CAPTURE OF KING LOUIS OF FRANCE



Louis IX., one of the noblest French kings, led a large army to the Holy Land. Though they fought valiantly, they were overwhelmed, and Louis himself was captured by the Saracens. This picture, painted on the walls of the Panthéon in Paris, shows the king a prisoner, and he was only ransomed by the payment of thousands of dollars. After his return to France he started on another Crusade, but died before reaching the Holy Land.

to travel to the Holy Land. But of these thirty thousand children, ten thousand had already strayed away before ever they reached the sea; and whether any of them got home again, no one knows. When the rest reached the sea, the luckless children fancied that God would drive the waters back, so that they might journey on to Palestine dry-shod, as the children of Israel passed through the Red Sea. Yet while they waited in that vain hope, certain evil-minded folk saw their plight, and said, "We will take you on our ships, as many as we can, not for money, but for the love of the

France, who is called Saint Louis; for he, having approved himself one of the best of all kings in his own land, and having won such repute for wisdom and virtue that men came to him even from other lands to judge between them and pronounce what was just, now left his kingdom in obedience to what he deemed the Divine call.

Nevertheless, for all his singleness of heart, he, too, was doomed to fail, for there were folly and jealousy among the leaders, and Louis himself lacked the skill of a great general. And it so befell that, at last, when the army was already well-nigh broken in pieces, a great host



The Sultan Saladin was the great champion of the Saracens against Christianity. He was not only a valiant fighter, but a chivalrous and large-hearted man, and held King Richard Lion-Heart in such honour that, though he defeated him, he asked him to come and see him and made a truce with him. This picture shows their meeting.

Holy Cross; " and so they took some five thousand of these children aboard. Now they sailed away joyfully; but when they had crossed the sea, those evil folk took them down to the slave-markets of the Turks, and sold them all.

Nine Crusades are counted in all, and though great men were numbered among them, who took the Cross, such as the German Emperor Frederick II., and in the last Crusade the English Prince Edward, who became Edward I., yet it seems as if there was only one of them who sought the Holy Land with a pure heart for the glory of God.

That one was Louis IX., King of

of Saracens came upon them, and overthrew them, though Louis himself and many another fought valiantly. Louis himself was taken prisoner, and was set free only for a very great ransom. After him there is no other Crusader to be noted unless it be Edward of England, of whom we read in another place. But of all the men who went on Crusade, although Richard Lion-Heart won the greatest renown for pure prowess in battle, yet the names which claim highest honour are those of Godfrey of Bouillon and Louis of France.

The next stories of Men and Women begin on page 1655.

THE HISTORY OF OUR LAND

WE are giving in this volume a short description of our government instead of another chapter of the History of Our Land. You will find that our Constitution is a written agreement under which the people of the United States agreed to live. This Constitution divides the government into three parts, one of which makes the laws, another carries them out, and the third decides whether or not they have been broken. The powers and the duties of all are described and you will see that the officers of none of these parts can do as they please but must obey the rules laid down in the Constitution. We find that our President has greater power than many kings, and that no other court has such authority as the Supreme Court of the United States.

HOW WE ARE GOVERNED

THE editor has decided to give you, in this volume, a little account of our government instead of going on with the History of Our Land. Later we are going to say a great deal about the Constitution and the trouble that arose between those who thought it meant one thing and those who thought it meant another. You cannot understand our history unless you know something about the government.

But why should you trouble your head about these matters of which the grown-ups talk? Because the boys and girls of today are the men and women of tomorrow. One of these days you will be expected to have a share in the government. All boys born in this country, and many who were not, will have to do their share after they become twenty-one years old.

What has the subject to do with girls? Do you know that in five states of the Union, into all of which our book will go, women have exactly the same rights of voting and holding office that men have; and in many other states they vote for some officers? Before you are grown up, it is quite possible that women will have the right to vote in many more states.

More than this, however, is the fact that boys and girls cannot be intelligent men and women or good citi-

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zens unless they know something about the laws of the land in which they live and can understand why such laws are necessary.

WHY DO WE HAVE A GOVERNMENT AT ALL

The word government means first of all, guiding or steering. Then the government of any country means the management of that country, and it is needed, just as a family or a factory needs management. In all countries there are, and always have been, bad people who would harm themselves and others unless prevented. So one of the purposes of government is to prevent and to punish bad actions, and to protect the people who behave themselves properly. Without a government of some sort the strongest could do as they pleased and the weak would have no rights at all. The strong man might rob the weak and the helpless.

Then too the citizens of one nation must be protected from other states. You will find when you read the history of the world that people have never been satisfied to stay in the land in which they were born but have often tried to take other lands by force. There have been many wars for this reason, and a part of the duty of a government is to protect its citizens from outside attacks.

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These two things, that is, to keep order in the land, and to protect the land and its people from outsiders, are the first and most important things a government has to do.

OTHER THINGS WHICH CIVILISED GOVERNMENTS DO

There are many other things which the governments of civilised nations do which add to the health, the happiness, the wealth or the convenience of the people. For example all civilised governments now provide schools for the children, care for the poor and the insane, build bridges across streams, carry mails, make roads, pave streets, build lighthouses, and do many other things that you can name if you stop to think a moment.

Most countries are so large that they are divided into parts and sometimes these parts are again divided. As I am writing this article, four different governments are over me. First is the United States, then the state of New York, next the county of New York and finally the city of New York. Some of these have one part of the work of government and some do another. But it is with the first, or government of the United States, that we shall say most. Perhaps we may talk about the government of states and cities in another volume.

THE KINDS OF GOVERNMENT NOW FOUND IN THE WORLD

We find in the world today two kinds of governments, which are known as **MONARCHIES** and **REPUBLICS**. The word monarchy means the rule of one, while in a republic the people rule through men whom they choose for the purpose. These monarchies are of two kinds, known as absolute and limited, and the ruler holds the power for his life and then it passes to his child or nearest relative.

In an Absolute Monarchy the ruler, called a king, czar, emperor, or some such name, has the entire power. His word is law. Whatever he orders must be done, no matter how foolish or how cruel it is. There are few such governments now, though once there were many. In Turkey the people have recently gained a share in the

government and in Russia they are struggling bravely to gain the right to speak.

In a Limited Monarchy, the power of the ruler is limited, or lessened, by a constitution which tells what the ruler may do, and what he may not do. In some of these governments, as in the German Empire, the ruler still has great power. In others, such as England, he has very little, very much less than the President of the United States. In all the limited monarchies the people have a large share in the government.

In a Republic the people have the power, which they give for a short time to officers elected by them, and to others chosen to represent them. If they think that an officer has not acted wisely or properly they can turn him out at the next election, or can bring him to trial before the end of his term.

THE GOVERNMENT OF THE UNITED STATES

The United States is a republic. The plan of government is set forth in the Constitution, of which you were told on page 1389, and which is the "supreme law of the land." This means that no law can be made which is in opposition to the Constitution in any way; that no officer or judge may do anything forbidden by the Constitution, and that he must do what is commanded by it.

The paper divides the government into three parts, the **LEGISLATIVE**, or law-making; the **EXECUTIVE**, which carries out the laws; and the **JUDICIAL**, which decides whether or not the laws have been broken. Each of these is independent of the others, and each of them helps to prevent the others from becoming too powerful.

THE LEGISLATIVE POWER

The Legislative power is in the hands of Congress, which is made up of two houses. In one called the Senate, each state, large or small, has two members, who are elected by the legislature of the state. These Senators represent the people of the whole state and serve for six years. A senator must live in the state he represents,

must be thirty years old, and must have been a citizen nine years. The House of Representatives is made up of members elected from states according to population. Every ten years Congress decides how many Representatives there shall be in the House and then divides them among the states according to population. The state is then divided into as many districts as it has members. Several states have only one representative each, while New York has forty-two, and Pennsylvania, thirty-six. Members are elected by the people for a term of two years. A representative must have been a citizen seven years, must live in the state he represents and must be twenty-five years old.

The duties and powers of the houses are not quite the same. The House of Representatives chooses its president, who is called the Speaker, though he does almost no speaking; the Vice-President is the president of the Senate. No law can be made unless both houses approve, but every measure which has to do with taxation must be first passed by the House of Representatives, and then sent to the Senate. This is because the Representatives were supposed to be closer to the people, who dreaded giving the power to tax to anybody because of their experience before the Revolution.

The Senate has some powers which the House has not. It shares with the President the power to make treaties or other agreements with foreign nations; it must approve of the men the President selects for high offices; and if the President or other high officers are charged with crimes, the Senate sits as a court to try them.

THINGS CONGRESS IS ALLOWED TO DO

The Constitution tells what kinds of laws Congress may make and what kinds are forbidden. For example, Congress may borrow money. This it does by issuing bonds, which are promises to pay a sum of money at some future time. Congress may make laws about trade, may coin money, make laws to punish imitators of this

money, and may establish post-offices.

Congress is also given power to make war; and to raise and support armies. Here the fear the people had of a standing army caused them to say that all money voted for an army must be for two years or less. At the end of that time, the money must be voted again. Some other things Congress may do, are to build and keep a navy, make laws for the capital city, erect forts and do all other things which are necessary to carry out the Constitution.

THINGS CONGRESS MAY NOT DO

On the other hand Congress was forbidden to do many things. It could not forbid the slave trade for twenty years, nor lay any tax on goods sent out from any state. This last provision was put in because every state was jealous of the others and feared that Congress might tax unjustly the goods produced by that state. It was also forbidden, for the same reason, to give the seaports in any state any advantage over those of another.

The people feared that some attempts to make one class of people higher in rank than another would be made, so they forbade Congress to give any title of nobility, and also forbade any officer of the United States to receive any present or title from any foreign government, for fear that he might be influenced. It was forbidden also to pass any act declaring a man guilty without a trial, or to pass a law to punish a deed after it had been committed.

THE EXECUTIVE POWER, AND THOSE WHO HOLD IT

The chief officer of this part of the government is the President, chosen for four years. There is nothing in the Constitution to prevent the election of any man for as many terms as the people desire, but since Washington and Jefferson each refused to serve more than eight years, it has been the custom to elect no man more than two terms.

The President and the Vice-President are not voted for by the people.

At the time of the adoption of the Constitution there were no quick ways of travelling or of spreading news. There were few newspapers and the people of one state knew so little of those in other states that it was thought impossible for the people generally to know enough about the great men of the country to make a proper choice. So it was decided to have the people of a state select a number of prominent men equal to the number of their Senators and Representatives taken together. These men, called electors, were then to meet and choose a President and a Vice-President. The same custom is kept up now but it is known at the time the electors are chosen exactly how they will vote. Therefore, though we do not vote directly for the President and Vice-President, it amounts to the same thing.

WHO CAN BE PRESIDENT OF THE UNITED STATES

The President must be a "natural born citizen of the United States," and must be thirty-five years old. As it has turned out nearly all of our Presidents have been over fifty years old when elected. If he should die or become unable to serve, the Vice-President takes his place, and so, of course, the same rules must apply to choosing a Vice-President. Congress was given power to decide who shall be President in case both President and Vice-President die, and has done so by making the members of the Cabinet the successors. So far in our history, both President and Vice-President have not died in the same term.

The President is Commander-in-Chief of the army and navy, though no president has ever taken the field in person. He appoints all the officers above the rank of colonel, and decides which one shall be in charge of the army. Lincoln always took great interest in all the plans of the generals and often changed them. The President also has power to grant pardons except in cases of impeachment. This means that even though a man has been convicted and sent to prison the President can release him, if he has broken a law of the United States.

With the laws of a state the President has nothing to do.

The President has power to make treaties, that is, agreements with foreign nations, but two-thirds of the Senate must approve before they become law. With the consent of the Senate he also appoints ambassadors, ministers and consuls to represent the nation in foreign countries. He also appoints United States judges, and thousands of other officers not otherwise provided for, but the consent of the Senate is necessary here also.

The President is instructed to give to Congress every year information on the state of the Union together with his recommendations. Both Washington and Adams visited Congress in person and spoke. Jefferson was a poor speaker and sent his recommendations in writing. Every President since has followed his example. This is called the President's Message, but Congress is not required to pay any attention to it. The President and all other officers can be removed from office by impeachment. One President, Andrew Johnson, was impeached but was declared not guilty. Enough has been said to show that the President is a very powerful ruler — much more powerful than most of the kings in the world. Yet there is little danger of any president becoming a dictator or a tyrant. He cannot control the other parts of the government, and the people can turn him out before he becomes too powerful.

THE ADVISERS OF THE PRESIDENT

The Constitution does not say anything about the advisers of the President, now called his Cabinet, except to say that he may consult with the heads of the departments. At present there are nine of these Cabinet officers. Congress at first only created three heads of departments called the Secretaries of State, of the Treasury, and of War. The Attorney General was not considered a head of a department in the beginning. Since that time the Navy Department, which controls the warships and all concerning them, has been created. The Post Office, which

controls carrying and delivering the mails, existed from the beginning but was not considered a department until later.

The Interior Department has to do with public lands, Indians, the Patent Office, and pensions, while the Department of Agriculture collects and distributes information valuable to farmers and has charge of the Weather Bureau. This Weather Bureau studies rainfall, winds and climate, and predicts the weather in advance.

The last department organised is that of Commerce and Labour, which has charge of all matters belonging to commerce, mining, manufacturing, the fisheries, the census, the lighthouses and many other things. Though one of the newest departments it is one of the busiest.

THE JUDICIAL POWER

The Supreme Court is the highest court of the land. It has nine judges appointed by the President for life or good behaviour. Congress has also established circuit courts and district courts below the Supreme Court. They are entirely separate from the state courts, with which the United States has nothing to do unless the Constitution is violated. They try men who have broken the laws of the United States by such acts as robbing the mails, or using them to cheat; by making imitations, called counterfeits, of money; or by cheating the United States out of taxes. They have nothing to do with the laws of the states.

These courts also try cases between citizens of different states, cases having to do with sailors and ships, and the like. Where ambassadors are concerned, or where a state sues another state or the citizens of another state, only the Supreme Court can try the case. The Supreme Court can declare any act of Congress or of a state legislature to be "unconstitutional." If it does this, the act no longer has any authority, but is wiped out. This is a very great power which no other court in the world has. Both houses of Congress may pass an act, the President may sign it, and then it may be

set aside by nine men or a majority of them.

Then the Constitution goes on to declare that all criminals shall be tried by a jury and that the trial shall be held in the state where the crime was committed. This provision was made because the people while colonists had seen their fellows tried by prejudiced judges and known the hardships of being taken from home for trial.

OTHER PROVISIONS OF THE CONSTITUTION

No state can treat the citizens of another state differently from its own, and if a criminal flees from his own state into another, the officers of the second state must give him up. No state can tax goods coming from another state, keep an army or navy, coin money, grant a title of nobility, or enter into any treaty.

New states may be formed by Congress but no state may be divided nor may two states or parts of states be joined without the consent of the legislatures. The small states had this inserted as in the beginning they feared that they would be joined to the larger states against their will.

The United States must see that each state has a republican form of government. This means that it is the duty of the United States to protect the rule of the people. Congress would prevent any man from making himself dictator of a state. The laws of Congress are above the laws of any state and if they disagree, the state must give way.

AMENDMENTS TO THE CONSTITUTION

It is made very difficult to change the Constitution, and very few changes have been made. The first ten amendments were added in 1791, the eleventh in 1798, the twelfth, in 1804, and the other three as a result of the Civil War. The first ten are really a part of the Constitution itself, and most of them grew out of the experience of the states before the Revolution.

One of them forbids Congress to make any law favouring or punishing any form of religion. Every man must have the right to worship as he pleases.

A man cannot be punished for his speeches or his writings unless they are intended to slander. In Russia today men are put in prison for their writings, and are not allowed to assemble in crowds without permission. Our Constitution says the people have these rights, which cannot be taken away by any officers.

You remember the Writs of Assistance which caused so much trouble before the Revolution. Such things are not allowed in the United States; nor can any man be tried twice for the same offence; nor can he be compelled to testify against himself; nor can private property be taken unless it is paid for.

Every criminal is entitled to a trial by jury, and has the right to hear the witnesses against him. No man can be tried in secret, nor shall excessive fines be imposed nor cruel or unusual punishments be inflicted. The government, for example, would not allow any state to punish a crime by cutting off the ears or by branding with a hot iron as once was done in several of them and in Europe also.

THE CIVIL WAR AMENDMENTS WHICH ABOLISHED SLAVERY

The Civil War amendments began in 1865 with the thirteenth, which abolished slavery in the United States. This was followed by the fourteenth, in 1868, which declared the negroes to be citizens and forbade the payment of any of the Confederate debt, or any payment for the loss of any slaves.

The fifteenth and last amendment, adopted in 1870, gave votes to the negroes by forbidding any state to deny any citizen the right to vote "on account of race, colour, or previous condition of servitude." Since that time many amendments have been proposed, but none have been adopted. One of the proposed amendments gave the right of electing senators to the people instead of to the legislature. Another would allow Congress to lay a special tax on incomes, while still another would change the beginning of the president's term from March 4th to April 30th, the date of Washington's inauguration.

WHAT THE CONSTITUTION WAS INTENDED TO DO

While the Constitution was intended to give the people the right to govern themselves, it was not intended to give the party, which happened to be in the majority in any year, the right to do everything it wished. As you have seen, Congress is permitted to do many things, but at the same time it is forbidden to do many other things.

Many of the things Congress is forbidden to do are those under which the colonies had suffered during British rule. They are the things which a strong and powerful part of the people might do to a weaker part. For example, Congress may not declare any man guilty without a trial, though such a habit had been common in Europe, nor may it lay taxes on the goods produced in any state. The Constitution was intended to protect the rights of the weaker side.

THE CONSTITUTION TO-DAY

For nearly a hundred and twenty-five years, the Constitution has been in operation. During the time we have grown from a nation of four million people into one of nearly a hundred million; from a union of thirteen feeble states into a great nation of forty-eight states with possessions in both the Old and the New Worlds. The plan of government has served us well and seems to be still strong. Yet we must realise that the history of our country is very short as the historian counts time. Other nations have existed for hundreds and even thousands of years and have then fallen. We must acknowledge that, as yet, our government is an experiment. Never before has the attempt to give the people authority to govern themselves been tried on so large a scale. Thus far the plan has succeeded wonderfully well, and for much of the success the Constitution is responsible. It prevents hasty changes, and at the same time allows the will of the people to express itself when the people have finally decided what they want.

THE WAVERLEY NOVELS

WE have already read the first of these famous stories, "Waverley," and we now take up two others of the same series: "Rob Roy" and "Guy Mannering." "Rob Roy," as to its plot, is one of the least satisfactory of Sir Walter Scott's novels. But it contains one of his most charming characters in Diana Vernon. Like Flora MacIvor in "Waverley," she is an enthusiastic Jacobite. The other noteworthy characters in the story, apart from the hero, are Bailie Nicol Jarvie, the kind-hearted but prejudiced and comfort-loving magistrate, and Andrew Fairservice, the humorous Scots gardener, who becomes the hero's servant. "Guy Mannering," one of the best of the novels, contains in the portrait of Colonel Mannering a picture of the author himself; and in Dominie Sampson, a world-famous study of a man, who, though ungainly in person, uncouth in speech, and full of ponderous and largely useless learning, was so devoted to the family that befriended him as to win general regard.

DIANA VERNON'S SECRET

From the Story of "Rob Roy"

FRANCIS OSBALDISTONE, the hero of "Rob Roy," is the son of an English merchant. Like Waverley, he becomes unwittingly involved in Jacobite intrigues. Escaping into Scotland, he enters the country of Rob Roy, the outlawed Highland chieftain—that between Glasgow, Stirling, and Ben Lomond—in search of documents on which the credit of his father's firm depends. In this quest he is befriended by the outlaw, after whom the novel is named. The story is written in the first person, and is supposed to be told by Francis Osbaldistone.

Rob Roy Macgregor Campbell was originally a cattle-drover. As a result of certain speculations, for which he had borrowed money from the Duke of Montrose, his lands were seized, his property was plundered, and his wife and children were turned adrift in mid-winter. He then declared open war on the duke. The year in which we meet him in the pages of Scott's novel is that of the first Jacobite rising of 1715.

Frank Osbaldistone first met Diana Vernon at the house of his uncle, Sir Hildebrand, in the Cheviot Hills. She was the niece of Sir Hildebrand, who had six sons, among them Rashleigh. Soon after his arrival at his uncle's seat, Frank Osbaldistone was informed, to his chagrin, that by a special family arrangement "Die" Vernon was to marry one of the sons



of Sir Hildebrand. Of these Rashleigh was a Richard III. in appearance—"in all but his hump-back." Of his brothers, Percival was a drunkard; Thorncliff, a bully; John, a boor; Richard, a gambler; Wilfred, a fool; Rashleigh was the scholar. They all met with untimely deaths.

Contemptuous of his male companions at the Hall, but piqued by jealous suspicion of the proffered friendliness of Die Vernon, Frank made too free with the wine-cup, and, striking the sneering Rashleigh, had drawn his sword on Thorncliff, when the two were separated by the others. Repentance came with the morning, when all except Thorncliff and Rashleigh endeavoured with clumsy kindness to remove the painful impression of the previous evening.

Invited by Die to the library, Frank was cross-questioned at considerable length as to what Rashleigh had said about her. After trying by all the means in his power to evade direct questions, he was at length compelled to admit that Rashleigh had told him the arrangement by which she was to marry Thorncliff.

"But, besides all this," pursued Diana, "Rashleigh said something of himself with relation to me. Did he not?"

"He certainly hinted that were it not for the idea of supplanting his brother,

he would now, in consequence of his change of profession (he was to go into an office instead of the Church) be desirous that the word Rashleigh should fill up the blank in the dispensation instead of the word Thorncliff."

DIANA IS TOLD OF THE FALSENESS OF RASHLEIGH OSBALDISTONE

"Ay? Indeed?" she replied. "Was he so very condescending? Too much honour for his humble handmaid, Diana Vernon. And she, I suppose, was to be enraptured with joy could such a substitute be effected?"

"To confess the truth, he intimated as much, and even further insinuated—"

"What? Let me hear it all!" she exclaimed hastily.

"That he had broken off your mutual intimacy, lest it should have given rise to an affection by which his destination to the Church would not permit him to profit."

"I am obliged to him for his consideration," replied Miss Vernon, every feature of her fine countenance taxed to express the most supreme degree of scorn and contempt. She paused a moment, and then said, with her usual composure: "There is but little that I have heard from you which I did not expect to hear, and which I ought not to have expected; because, barring one circumstance, it is all very true. But as there are some poisons so active that a few drops, it is said, will infect a whole fountain, so there is one falsehood in Rashleigh's communication powerful enough to corrupt the whole well in which Truth herself is said to have dwelt. It is the leading and foul falsehood that, knowing Rashleigh as I have reason too well to know him, any circumstance on earth could make me think of sharing my lot with him."

THE ROMANTIC POSITION OF THE WIN-SOME DIANA VERNON

"No," she continued, with a sort of inward shuddering that seemed to express involuntary horror, "any lot rather than that—the sot, the gambler, the bully, the jockey, the insensate fool, were a thousand times preferable to Rashleigh—the convent, the gaol, the grave shall be welcome before them all."

"There was a sad and melancholy cadence in her voice, corresponding with the strange and interesting

romance of her situation," the narrator goes on to say. "So young, so beautiful, so untaught, so much left to herself, and deprived of all the support and protection of female friends, it is scarce metaphorical to say that my heart bled for her. Yet there was an expression of dignity in her contempt of ceremony—of upright feeling in her defiance of falsehood—of firm resolution in the manner in which she contemplated the dangers by which she was surrounded, which blended my pity with the warmest admiration. She seemed a princess deserted by her subjects, and deprived of her power, yet still scorning those formal regulations of society which are created for persons of an inferior rank; and, amid her difficulties, relying boldly and confidently on the justice of Heaven, and the unshaken constancy of her own mind. I offered to express the mingled feelings of sympathy and admiration with which her unfortunate situation and her high spirit combined to impress me, but she imposed silence on me at once."

THE BRAVE WORDS OF A TRUE HEROINE OF ROMANCE

"I told you in jest," she said, "that I disliked compliments—I now tell you in earnest that I do not ask sympathy, and that I despise consolation. What I have borne, I have borne. What I am to bear I will sustain as I may; no word of commiseration can make a burden feel one feather's weight lighter to the slave who must carry it. There is only one human being who could have assisted me, and that is he who has rather chosen to add to my embarrassment, Rashleigh Osbaldistone."

"Yes! the time once was that I might have learned to love that man, but what should I have been in this world, and the next, in body and soul, had I fallen under the arts of this accomplished villain! He bears a charmed life; you cannot assail him without endangering other lives, and wider destruction. Had it been otherwise, in some hour of justice he had hardly been safe, even from this weak hand. I told you," she said, motioning me back to my seat, "that I needed no comforter. I now tell you I need no avenger."

Rashleigh, soon after Miss Vernon had thus taken Frank into her

DIANA VERNON AND THE MYSTERIOUS GLOVE



In the romantic story of Diana Vernon, the charming heroine of Scott's stirring tale "Rob Roy," the manly young hero, Francis Osbaldistone, who is in love with Diana, is greatly disturbed by finding in the library a strange glove, which he knows must belong to someone who has visited Diana, and her explanation scarcely clears his mind from care; but she has a good reason for keeping the secret of the glove, as we shall find when we read the story.

confidence, left to take up the position in Mr. Osbaldistone's office which Frank himself had abandoned. The studies which Miss Vernon had begun with Rashleigh, she now resumed with Frank for her companion. Frank also began to take some interest in a priest, Father Vaughan, who appeared to divide his time between Osbaldistone Hall and about half a dozen mansions of Roman Catholic gentlemen in the neighbourhood. About this priest there was some mystery. He seemed to enjoy the complete confidence of both Diana and Rashleigh.

At the end of a few months' time, during which he received no word from his father, Frank learned from Miss Vernon that Mr. Osbaldistone had gone to Holland, leaving all his affairs in the hands of Rashleigh. This news was imparted in the library, and accompanied by the advice that Frank should go to London and see his father's confidential clerk. Whilst they were talking Frank saw the tapestry shake that covered the door of the secret passage from Rashleigh's room, and Diana asking him to leave her, he did so with mingled feelings.

THE MYSTERY OF THE SECRET PASSAGE BEHIND THE TAPESTRY

Convinced that Miss Vernon was secretly receiving a rival, Frank decided to discover who the stranger was. He convinced himself that he was justified in doing this on the ground that it would be a service to Sir Hildebrand, "who was probably ignorant of the intrigues carried on in his family," and a still greater service to Miss Vernon, "whose frank simplicity of character exposed her to so many risks in maintaining a private correspondence, perhaps with a person of doubtful or dangerous character."

Frank discovered a man's glove in the library, and learned from Miss Vernon that it belonged to one whom she honoured, but was refused further information on this point.

While his mind was still disturbed with this discovery, Frank received a letter informing him that his father was in grave financial trouble, and that Rashleigh had left London for Glasgow with certain valuable papers. Owen, the confidential clerk, had been despatched to Glasgow to find Rashleigh,

and Frank was asked to follow him. It was necessary for Mr. Osbaldistone's credit that the funds in Rashleigh's possession should be recovered by a certain day, the 12th of September. On learning this, Miss Vernon, in bidding Frank farewell, put a packet into his hands, instructing him what to do with it.

THE HERO RECEIVES A SEALED PACKET FROM DIANA AND BIDS HER FAREWELL

"Take this packet," she said. "Do not open it until other and ordinary means have failed. If you succeed by your own exertions, I trust to your honour for destroying it without opening or suffering it to be opened. But if not, you may break the seal within ten days of the fated day, and you will find directions which may possibly be of service to you. Adieu, Frank; we never meet more, but sometimes think of your friend Die Vernon."

Frank set out for Glasgow with Sir Hildebrand's gardener, Andrew Fair-service, as his attendant. Very shortly after his arrival in Glasgow he was befriended by the fearless Rob Roy, to whom, when he opened Die Vernon's letter, he found that this epistle was addressed. His next adventure was an encounter with Rashleigh, from whom he was separated by Rob Roy.

In the Highlands he was arrested on a charge of conspiracy, a charge which his connection with Osbaldistone Hall and the fact that he was found to have been in communication with Rob Roy supported. But eventually all came right. Frank recovered the missing assets, and, what made equally for his peace of mind, he found out that the person who had been secreted at Osbaldistone House was Die Vernon's own father, a prominent Jacobite, who had taken the name of "Father Vaughan" as a disguise.

FRANCIS OSBALDISTONE COMES TO HIS OWN, AND ALL ENDS HAPPILY

At first Rashleigh had espoused the Jacobite cause, but when he found that his suit was rejected by Diana, he went over to the other side, and his treachery to Frank's father was followed by even worse treachery to the Vernons. He also behaved infamously to Rob Roy. But punishment was meted out to him in the end, and all ended happily with the succession of Frank to the Osbaldistone estates and his marriage to Diana.

THE SMUGGLER'S REVENGE

Being the Romantic Tale of "Guy Mannering"

IT was in the beginning of the month of November, 17—, when a young English gentleman, who had just left the University of Oxford, made use of the liberty afforded him to visit some parts of the North of England; and curiosity extended his tour into the county of Dumfries. Losing his way one night, he found a hospitable welcome at the hands of Godfrey Bertram, the laird of the impoverished estate of Ellangowan. The young Englishman was Guy Mannering. His arrival happened at the time of the birth of an heir to the house of Ellangowan.

He stayed long enough to make the acquaintance of his host's companion, Dominie Sampson, "a poor, modest, humble scholar, who had won his way through the classics, but fallen to the leeward in the voyage of life"; and Meg Merrilees, a half-crazy woman, who was as devoted as the Dominie to the house of Ellangowan, and who was regarded by the band of gipsies in the locality as an extraordinary woman, gifted with supernatural powers.

Meg Merrilees Denounces the Laird for his Treatment of the Gipsies

Another incident in Guy Mannering's stay at Ellangowan was his encounter with one Dirk Hatteraick, a smuggler, who appeared to be in league with Meg Merrilees and the gipsies. About this time Godfrey Bertram was made a Justice of the Peace, and one of the first uses he made of the power thus conferred upon him was to eject the gipsies from a spot called Derncleugh. This action brought down upon him the curse of Meg Merrilees, whose nephew had been given up to the press-gang, but who still preserved her devotion to the laird's son, little Harry Bertram, "one of the most lovely children who ever made a sword and a grenadier's cap of rushes." Harry's education was entrusted to the Dominie, and these two were always together.

When he had moved on the gipsies, the laird set to work against the smugglers. This work was taken up with much energy by an excise officer, named Frank Kennedy. One day Dirk Hatteraick's lugger was chased by a

revenue vessel, and the smugglers only escaped by setting fire to their lugger, and taking to their boats, near a headland known as Warroch Point.

It happened that the Dominie and his young charge were walking in this direction when they were overtaken by Kennedy. The child, seeing that Kennedy was mounted, reminded him of a promised ride. The officer took the boy with him, whilst the Dominie, satisfied that his pupil was in safe hands, returned to the house.

How the Gipsies Kidnapped the Young Heir to the Lands of Ellangowan

The next time Kennedy was seen, he was lying dead at the foot of the cliff. At the summit of Warroch Point were signs of a struggle. But no sign of the heir of Ellangowan was to be found anywhere. The gipsies were arrested, but no evidence of their complicity in the outrage could be discovered. That day a little sister to Harry Bertram was born, and the laird was left a widower.

Seventeen years later, Guy (now Colonel) Mannering, was once again in the vicinity of Ellangowan. His wife had died in India, and his daughter, Julia, was staying at the house of a friend in Westmorland. The colonel, who had returned from the East full of honours and a rich man, stopped at the village of Kippletringan, at the small but comfortable inn of the Gordon Arms, which was kept by Mrs. MacCandlish. Here he learned that creditors were in possession of the Ellangowan estate, which was about to be sold by auction. It appeared that one, Gilbert Glossin, a man who had risen by crooked means and whom the laird had befriended, was especially anxious to secure the property.

The Triumph of a Rascal and the Sad End of Godfrey Bertram

The colonel, after communicating with the Sheriff-substitute MacMorlan, attended the sale. His old host the laird, now very feeble, was carried to the green before the old castle, so as to be out of sight of the "unco' spectacle" at the New Place. He was accompanied by his daughter, Lucy, and the

Dominie. The son of a neighbouring landlord, Charles Hazlewood, was also in sympathetic attendance, especially where Lucy was concerned. But all the precautions did not serve to ward off an encounter between the old laird and Glossin.

THE SAD END OF THE OLD LAIRD OF ELLANGOWAN

This had a terrible result in the sudden death of the laird, as a consequence of which the sale was suspended till Miss Bertram could consult with her friends. During this interval the colonel left the neighbourhood to visit his own daughter, and Lucy Bertram and the Dominie found refuge in the household of MacMorlan.

Owing to delay on the part of a messenger of the colonel, there was no bid against Glossin when the sale of Ellangowan took place, but people commented on the fact that had the heir but lived, the transfer would not have been possible.

Colonel Mannering's journey to Westmorland was due to a letter he had received from his daughter's guardian, Mr. Arthur Mervyn. In this epistle Mr. Mervyn alluded to Miss Mannering's apparent romantic attachment to some unknown musician, who serenaded her from the lake below Mervyn Hall. This nocturnal minstrel was known to Miss Mannering by the name of Brown. Brown had been a cadet in the colonel's regiment in India. His origin was obscure, but he was in other respects a young man of great promise. His attentions had been paid to Miss Mannering whilst he was in India. The colonel did not know this.

THE COLONEL FIGHTS A DUEL WITH HIS DAUGHTER'S SWEETHEART

He did not know either that Brown had been encouraged by Mrs. Mannering. Tales against him were brought to the colonel, and one day this gallant officer had called out the young man to a duel. Brown had fallen, and, a body of native marauders appearing after the first shots had been fired, Brown was left on the ground for dead. Ever since it had been a source of grief to the colonel that he had been so hasty.

At Mervyn Hall Miss Mannering learned that Brown still lived. Her lot was not regarded by herself as a happy

one. Her guardian was thoughtful and kind, but she feared his wife. And the colonel's relations to her may be gleaned from the fact that she had been separated from her girl friend on account of an ungrammatical phrase in an Italian exercise and three false notes in a piece of music.

The colonel took a house—"Woodbourne"—near Ellangowan, and decided that his daughter should live with him there and have as a companion Lucy Bertram. As for the Dominie, whose life seemed to depend upon his remaining in attendance on the daughter of his old patron, the colonel decided that he should have the task of arranging his large library. The scene in which Colonel Mannering communicated this intention to Julia is very brightly described—Julia is writing to the friend from whom she had been separated.

COLONEL MANNERING'S AMUSING INTERVIEW WITH HIS LIVELY DAUGHTER

"I have now had an interview with my father, as confidential as, I presume, he means to allow me. He requested me to-day, after breakfast, to walk with him into the library: my knees, Matilda, shook under me, and it is no exaggeration to say I could scarce follow him into the room. 'Julia,' he said, 'my agent writes me from Scotland, that he has been able to hire a house for me, decently furnished, and with the necessary accommodation for my family—it is within three miles of that I designed to purchase.' Then he made a pause, and seemed to expect an answer.

"'Whatever place of residence suits you, sir, must be perfectly agreeable to me!'

"'Umph! I do not propose, however, Julia, that you shall reside quite alone in this house during the winter.'

"'Mr. and Mrs. Mervyn,' thought I to myself.

"'Whatever company is agreeable to you, sir—,' I answered aloud.

"'Oh, there is a little too much of this universal spirit of submission; an excellent disposition in action, but your constantly repeating the jargon of it puts me in mind of the eternal salaams of our black dependents in the East. In short, Julia, I know you have a relish for society, and I intend

to invite a young person, the daughter of a deceased friend, to spend a few months with us.'

" 'Not a governess!' exclaimed poor I, my fears at that moment totally getting the better of my prudence.

" 'No, not a governess, Miss Manner-ing,' replied the colonel somewhat sternly, 'but a young lady from whose excellent example, bred as she has been in the school of adversity, I trust you may learn the art to govern yourself.'

" 'Is this young lady a Scotch woman, papa?'

" 'Yes,—drily enough.

" 'Has she much of the accent, sir?'

her father is a very good sort of man, and I believe I shall make room for him in the house.'

" 'Chaplain, papa? But will he read us the Church of England service?'

" 'The apparent simplicity with which I asked this question got the better of his gravity. 'Come, Julia,' he said, 'you are a sad girl, but I gain nothing by scolding you. Of these two strangers the young lady is one whom you cannot fail, I think, to love; the person whom, for want of a better term, I called chaplain, is a very worthy and somewhat ridiculous personage, who will never find out you laugh at him,



MEG MERRILEES CURSED THE LAIRD OF ELLANGOWAN AS HE RODE BY

" 'Much——!' answered my father hastily. 'Do you think I care about a's and aa's, and i's and ee's? I tell you, Julia, I am serious in the matter. . . . I have resolved that this young lady shall be a member of my family for some months, and I expect you will pay her that attention which is due to misfortune and virtue.'

" 'Certainly, sir.—After a pause.—'Has she any attendant? Because, you know, I must provide for her proper accommodation if she is without one.'

" 'N-no—no—not properly an attendant—the chaplain who lived with

if you don't laugh very loud indeed.'

" 'Dear papa! I am delighted with that part of his character. But pray, is the house we are going to as pleasantly situated as this?'

" 'Not, perhaps, as much to your taste—there is no lake under the windows, and you will be under the necessity of having all your music within doors.'

" 'This ended the keen encounter of our wits; for you may believe, Matilda, it quelled all my courage to reply.'

Later, when the Mannerings, Miss Bertram, and the Dominie were

together at Woodbourne, the colonel took an opportunity to ask his daughter how she liked their guests.

"Oh," was the reply, "Miss Bertram of all things. But this is a most original parson—why, dear sir, no human being will be able to look at him without laughing."

"While he is under my roof, Julia, everyone must learn to do so."

"But, papa, the very footmen could not keep their gravity!"

"Then let them strip off my livery," said the colonel, "and laugh at their leisure. Mr. Sampson is a man whom I esteem for his simplicity and benevolence of character."

"Oh, I am convinced of his generosity, too," said this lively lady; "he cannot lift a spoonful of soup to his mouth without bestowing a share on everything round."

COLONEL MANNERING SAYS A GOOD WORD FOR DOMINIE SAMPSON

"Julia, you are incorrigible; but, remember, I expect your mirth on this subject to be under such restraint that it shall neither offend this worthy man's feelings nor those of Miss Bertram, who may be more apt to feel on his account than he on his own. And so, good night, my dear; and recollect that, though Mr. Sampson has certainly not sacrificed to the graces, there are many things in this world more truly deserving of ridicule than either awkwardness of manners or simplicity of character."

The reader, like Miss Manning, will surely arrive at the same conclusion as Colonel Manning.

Brown, unaware of the cause of the colonel's dislike, found his way to the vicinity of Woodbourne. After meeting with Meg Merrilees, he encountered Miss Manning, Miss Bertram, and Mr. Hazlewood, when these three were out walking. On seeing him so unexpectedly, Julia screamed. Mr. Hazlewood mistook the scream as one of fright, and Brown's appearance, owing to a midnight adventure, was not of a kind to arouse confidence at first sight.

Consequently young Hazlewood raised a gun he was carrying and, pointing it at the man he regarded as a smuggler, threatened to fire at the intruder if he did not move away.

Stung by this treatment, Brown sprang at Hazlewood with the intention of taking the gun from him. The weapon went off in the scuffle, Hazlewood was wounded, and, the screams of the women bringing assistance, Brown made his escape from the scene.

THE LOST HEIR TO THE HOUSE OF ELLANGOWAN IS FOUND AT LAST

His case now seemed a hopeless one, especially as evidence was found of his relations with Meg Merrilees, and the gipsies had attacked Colonel Manning's house. After a series of other adventures he was arrested by Gilbert Glossin, charged with an attack on young Hazlewood. Glossin quickly identified him with Harry Bertram, the missing heir of Ellangowan, and schemed to have him carried off by the smugglers, so that he, Glossin, might continue at Ellangowan. But others, Meg Merrilees included, had discovered that Brown and Bertram were one and the same person, and eventually he was restored to his own and his wrongs were righted.

It appeared that when the smugglers attacked and killed Frank Kennedy at Warroch Point, the child's life was saved at the intercession of Meg Merrilees. But the boy was taken to Holland. There he found a protector, and thence he made his way to India, still ignorant of his parentage. After Colonel Manning's return to England, Brown, as young Bertram was called after his patron in Holland, was given a captaincy. Glossin was a party to the kidnapping at Warroch Point, and Glossin all but succeeded in getting rid of the heir to the estates he had bought. But his ill deeds found him out, and he died miserably—an example of a man whose natural gifts, rightly used, should have brought him both riches and honour.

HOW COLONEL MANNERING BECAME ONE OF THE HAPPIEST MEN ALIVE

Misunderstandings were happily cleared away between Colonel Manning and Harry Bertram, and when Julia became the latter's wife, the colonel was among the happiest of men. His delight even rivalled that of the Dominie. And with the announcement of a wedding between Charles Hazlewood and Lucy Bertram the story ends.

The next story of Famous Books is on 1645.



MAKING A TOY TO MEASURE THE WIND

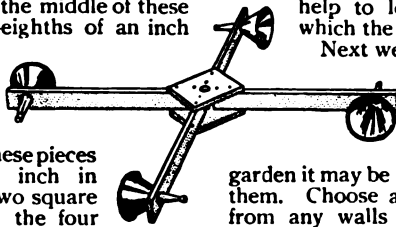
ANY boy can make an interesting toy that will enable him to appreciate the force of the wind, and even, to some extent, to tell the speed of the wind. The first things required are two pieces of wood 3 inches square and half an inch thick. Through the middle of these make a hole about three-eighths of an inch in diameter. Now take four pieces of wood 15 inches long, 2 inches wide, and half an inch thick, as seen in picture 3. Near one end of each of these pieces make a round hole 1 inch in diameter. Now nail the two square pieces to the edges of the four long pieces in position shown in the picture 1,

CONTINUED FROM 1512

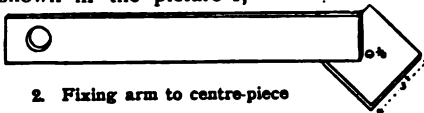
wind will blow into the mouth of each in turn, as the arms spin around. The funnels should be

pushed in tightly, and string may be used to tie them into place. Each funnel may be painted a different colour, and this will help to let us judge the speed at which the wind blows them around.

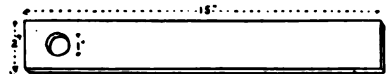
Next we require a post erected in the garden, so that the revolving speeder may be mounted on top of it. If there are any wooden clothes - posts in the garden it may be mounted on top of one of them. Choose a post as far as possible from any walls that would prevent the wind from having a free course to reach the speeder.



1. Speeder ready for mounting



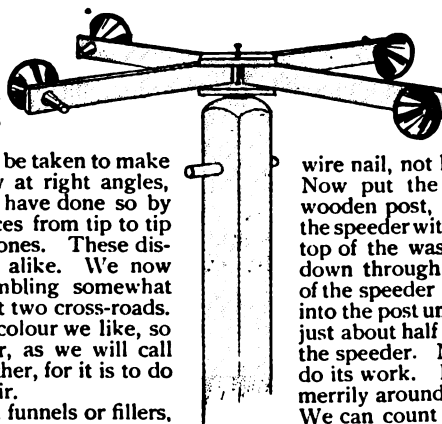
2. Fixing arm to centre-piece



3. One of the four arms

keeping the inside ends of the long pieces a little distance away from the hole in the middle of the square pieces. Picture 2 shows the first stage in this operation. Care must be taken to make the four pieces exactly at right angles, and we may see if we have done so by measuring the distances from tip to tip of any two adjoining ones. These distances should be all alike. We now have something resembling somewhat the top of a signpost at two cross-roads. We can paint it any colour we like, so that the wind-speeder, as we will call it, may stand the weather, for it is to do its work in the open air.

We now get four tin funnels or fillers, 4 or 6 inches diameter at the mouth, and into the spout of each put a cork that will close the end. These funnels we place in the round holes which were made near the tips of the wooden arms. They must be put in all from the sides, as seen in picture 1, so that the



4. Speeder ready for work

The next thing is to get a washer—that is, a small flat ring of iron with a hole of, say, half-inch size. Washers are very cheap. We shall also want a round wire nail, not less than 5 inches long. Now put the washer on top of the wooden post, right in the middle, put the speeder with its arms and funnels on top of the washer, and drive the nail down through the hole in the centre of the speeder through the washer and into the post until the head of the nail is just about half an inch above the top of the speeder. Now we can let the wind do its work. It will send the speeder merrily around when it blows briskly.

We can count how often the arms go round in a minute, and the different colours of the funnel will enable us to count the revolutions easily. If we find that one day the revolutions are more per minute than on another day, we can tell that the wind is stronger, and if the revolutions are fewer the wind is not so strong.

THE HORSE FOR OUR TOY ZOO

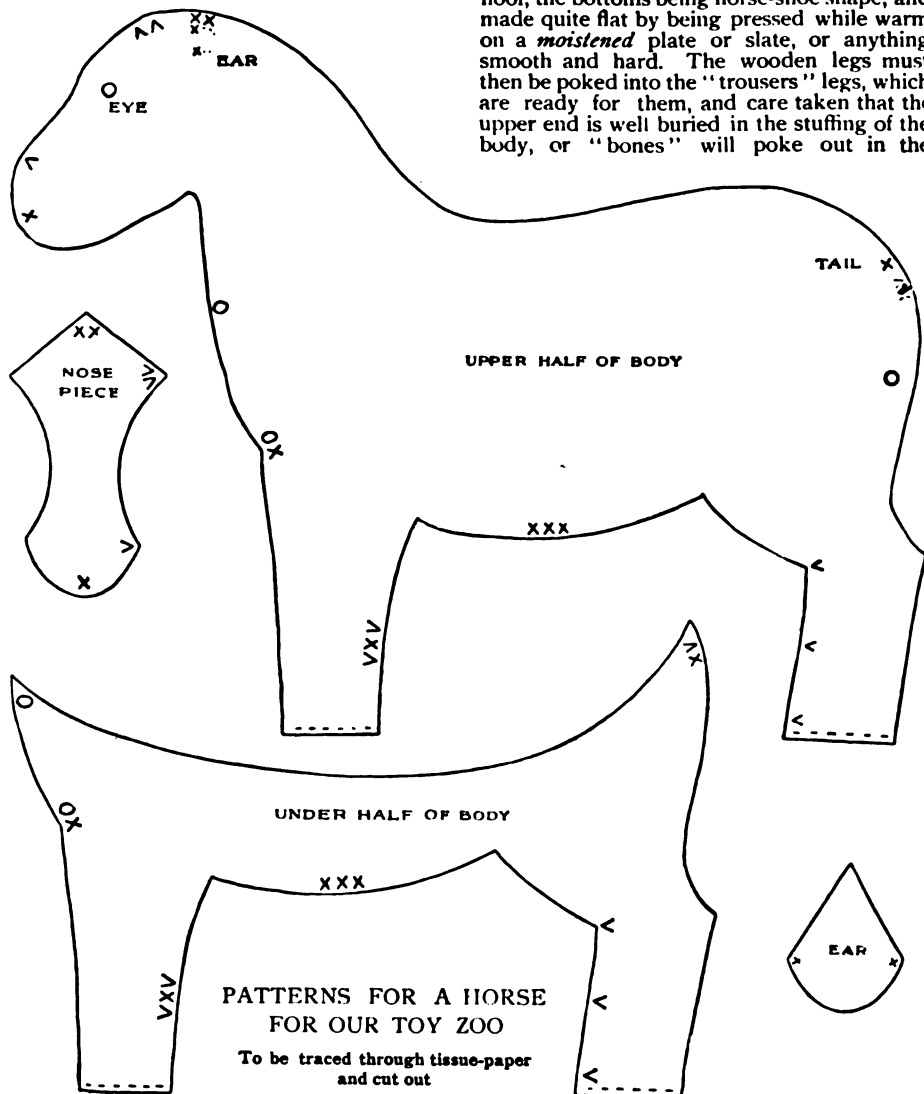
OUR horse is made of brown velveteen, although good sateen looks very nice, and both, being materials likely to fray, have to be everywhere turned in at the raw edge. The colour of the thread should match that of the material if possible.

The fitting in of the nose-piece is the most difficult part in making the horse; but if you put the point in the nose-piece on the top of the horse's head, and stitch the edge to the edge down past vv to v and x, taking no notice at all of the difference in shape, but making the edges come together, with the neatest possible work, it will not be difficult. This is the first thing to do—fastening the piece to both sides of the face, and then join-

ing up from chin to throat. In stitching up the legs, leave the bottoms open at the dotted line.

When the horse is finished, and the body and thighs stuffed, it is well, when sewing up the under seam, to leave about an inch open in a convenient place for adding a little more wadding, if required, to the upper part of the legs.

In the horse's legs we need four sticks of wood, each about as thick as a slate pencil. The hind legs take three and a quarter inches, and the front legs two and three-quarter inches. Smooth off the sharp corners, and pare the wood down a little at the hoof end. These ends must each be well covered with good glue, moulded to the shape of a hoof, the bottoms being horse-shoe shape, and made quite flat by being pressed while warm on a *moistened* plate or slate, or anything smooth and hard. The wooden legs must then be poked into the "trousers" legs, which are ready for them, and care taken that the upper end is well buried in the stuffing of the body, or "bones" will poke out in the



haunches, and make the horse look starved. The bottoms of the "trousers" must be turned in, and sewn very tightly with double thread just above the hoof, winding the thread round several times before fastening off. Push the extra piece of stuff in the "trouser" to the back part of the hoof, where it will form the fetlock. Then shape the leg by pulling the stuff very tightly round it about three-quarters of an inch above the fetlock, and sewing it together on the inner side of the leg for about another three-quarters of an inch to make the thin part of the leg. Above this part let it come wider again, and for the front legs poke in from above enough wadding to make this wider part look plump, and keep the wood from showing through the stuff.



The inner side of the horse's legs

On the inner side, which is a good deal out of sight, the leg looks like the little sketch (A) shown here. The stitches are made extra large that you may easily see where they should be. The hind leg has a little more work in it, because we have to make it poke out where the big joint is. This is allowed for in the cutting, but must be shown quite plainly by stitching in the stuff close to the wood just here, leaving the corner bit sticking out.



The horse for our toy Zoo

There is another little sketch on this page (B) which makes this quite clear. These extra stitches are carried right through from the inner to the outer side of the leg. Make

the thigh part of the hind leg as plump as possible, poking tiny bits of wadding in through the hole left in the under seam, until the wood cannot be seen anywhere.

The horse's tail is about a square inch of material turned in and folded and stitched to about the thickness of a pipe-stem round a bunch of brown worsted or silk, from three to five inches long. The upper end is then rounded off, turned under and hemmed, single, into position as the picture shows.

The mane, of worsted or silk, is about two and a half inches long. It is sewn on in double tufts, like the lion's mane. The ears are made double and turned, like the cat's and tiger's ears, but they are narrower and more pointed. The openings are towards the face.

The eyes are made of black beads, and the nose is marked in black worsted or silk along the joins of the nose-piece, giving a few extra stitches, just like the sketch, to show the large nostrils.

If we are good at drawing, the pattern of the horse given here should be enlarged from the copy to $5\frac{1}{4}$ inches from o on the chest to o at the tail; while from xx on the top of the head to the bottom of the front leg should be $5\frac{1}{2}$ inches, making all the other parts, of course, in proportion. If this is done the horse will be much more easily made and the effect better in every way.

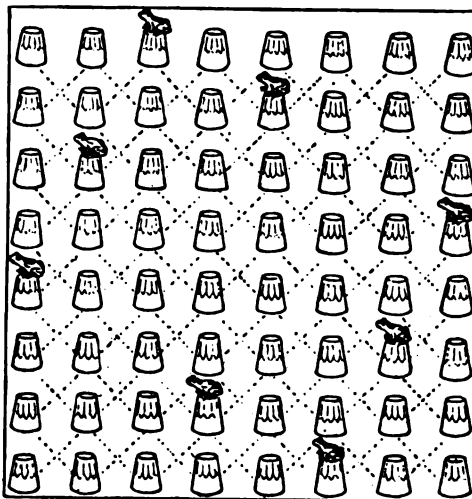
HOW DID THE FROGS JUMP ON THE TUMBLERS?

HAVE you seen little frogs jumping about in the grass near a pond, or springing away from under the leaves when you go to find strawberries in the strawberry bed? How easily they jump! See if you can find out how they jump on tumblers in this puzzle.

Sixty-four tumblers are arranged on a table in the form of a square, as shown in the picture, eight along each side and the others in rows between. Eight of the tumblers have frogs sitting on them.

Now, three of these frogs are going to jump on to other tumblers without frogs on them, but they must jump on to tumblers where they will still not be in a line with another frog,

neither upwards, downwards, crossways, nor sideways. The dotted lines in the picture show how the line goes sideways.



A frog may not jump on to a tumbler where another one is already seated, nor on to one which has already had a frog seated upon it. There are so many tumblers to choose from that it seems there must be many vacant seats for the three frogs that want to jump; but remember that *no two frogs may jump on to tumblers in the same line.*

This problem of the frogs is given in Mr. Henry Dudeney's book of Canterbury Puzzles.

The way the frogs jumped is explained in that part of our book beginning on page 1619.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO IN THE MIDDLE OF SEPTEMBER

OUR summer work in our little garden plots is rapidly drawing to a close; but the autumn is a very busy time for all keen gardeners. In fact, the autumn work is even more important than the spring work, and many of our spring flowers have to be planted at this season.

Just at present, however, our gardens are, or they ought to be, bright and beautiful, and so full of plants that there is little or no room for planting or sowing. For all that, we must not be idle. Very likely you put away your pots in the spring when you planted out your geraniums, fuchsias, and other flowers that you keep in the house through the winter. Now, you must make it a rule never to plant anything in a dirty or green pot. It is quite easy to get rid of the green mossy growth—a scrubbing-brush and some water will soon do the work—but before using the pots they must be perfectly dry. When new pots are bought they should be soaked in water and allowed to dry before being used.

In some of them the old geraniums and other plants may be potted up when we begin to fear frosts; but long before this is necessary, and, indeed, at once, we may pot up some bulbs to flower very early in the spring if we have a window in the house, or a corner of the conservatory in which to place them.

If we have six pots in which to grow bulbs, we may put in the crocks—never plant without these at the bottom of the pots, or the plants will not thrive—and for soil we may take about equal parts of leaf-mould, loam, and silver sand—rather less of the sand—and mix all carefully together. The pots may be filled, and the bulbs planted.

A capital selection of bulbs would be one pot each of Roman hyacinths, hoop petticoat daffodils, snowdrops, crocuses, tulips, and hyacinths of a larger and finer variety than the early flowering *Roman* hyacinths.

One of these larger hyacinths is enough for the pot, while three or four tulips, six crocuses, six snowdrops, four daffodils, or four or five Roman hyacinths are enough for a five-inch pot. If yet another pot were to be added it should be a pot of freesias, which, beside producing beautiful pale flowers, are also sweetly scented. Once the bulbs are safely and firmly potted we must keep them for some weeks in the dark. Either they must go down into a dark cellar, or we may invert another pot on each, place them on ashes, and cover them with ashes or dead leaves.

The reason for this darkness is wonderfully interesting. The bulbs, after being planted, have to grow in two directions, downwards from the base of the bulb in the form of roots,

and upwards from the point of the bulb to form leaves. Now, as the roots find the nourishment of the soil and convey it to all parts of the plant, it will be quite clear that it is necessary to have root growth before top growth, so that this top growth, when it appears, shall be sufficiently nourished. The darkness encourages this root growth, and therefore, until the roots have been formed, say, in five weeks, we keep the pots containing the bulbs away from the daylight.

Freesias do not require this period of darkness, and are better without it.

All the pots need not be planted at the same time. The tulips and hyacinths, for instance, may be left until October, though the Roman hyacinths should be put in now, in order to flower in the winter.

You already know all about the summer treatment of your violets, and we will suppose that someone is going to give you the entire care of a frame of double violets for the winter. It will be a very interesting hobby, and a success if you only take the trouble to find out what the little plants need for their welfare. The time has come to put them in the frames, for there will be a better chance of success if they are established thus early before winter.



A bed of violets

A frame six feet by four feet is excellent, and, if possible, it should be in a warm, sheltered position that gets as much of the sunshine as it can; that is to say, it should face the south. You can fill

it nearly full of soil. But it may be that there is a difficulty in getting this amount of soil. In that case collect some dry dead leaves and more than half fill the frame with these. Now get into the frame and tread them down as firmly as possible, and on the top of them put quite a foot of soil. A good plan to know the depth of the soil you have put in is to mark on one of the outside boards the depth of the leaves. You can then tell the amount of soil.

It is one of the most important points of growing violets in frames successfully to have the plants almost *touching the glass* when the lights are put into place. The frame is a good deal deeper on one side than the other, and, of course, the soil must follow the same line of slope. Make the soil firm and let everything settle down for a few days. After that you may lift your violet plants and get them into place. Plant so that they do not touch by some four inches or so, or a little less. Watering greatly helps in settling them. But for the present there is no need to put on the glass lights. If the dews should be exceptionally heavy they may be drawn on at night, but on no account must they be closed down—a piece of wood or brick should tip them up. Violets want air to flourish well.

MAKING A PARSONAGE FOR MODELTOWN

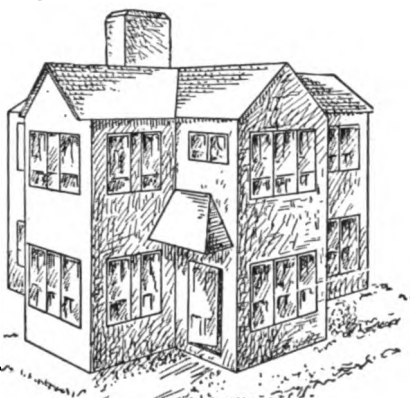
ONE of our most important buildings was the Modeltown Church. Next we built a chapel, which was much simpler and easier to make. Our present task is the building of a house for the minister to live in. This house will be called the parsonage, and we shall make it now. There will be more parts to add than there were in the chapel, so that the work will be a little more difficult.

General views of our parsonage are given in pictures 1 and 2. Picture 1 gives a plan of the building, and is made one-third scale, so that in taking our sizes from the picture we use scale-rule C, which was given away with THE CHILDREN'S ENCYCLOPÆDIA, and make the lines on our card with our full-sized scale-rule. We remember, of course, the explanation given on page 446 regarding the meaning of the three different kinds of lines in the plans, so that we need not go over the meaning of these lines again.

of the remaining walls glued to the low sloping roof, and finally picture 7 gives us a view of the framework glued together, leaving only one part to hinge open. We now see the meaning of the many curiously-shaped portions of the plan in picture 10. Every part has been carefully planned, and we find that many things which seemed at first to have no relation to each other fall into harmony and make a complete whole.

We shall now make and add a hall, with a bedroom upstairs. The plan of this part is given half-scale in picture 12. We therefore take our measurements with rule B, making our lines on the card with our full-sized rule. In bending up the hall before gluing, it will assume the position shown in picture 8. We glue the roof to the sides, and then we attach the whole piece to the place in the wall marked on the plan in picture 10, again using glue to fix it in position.

To the bedroom of the minister's study we

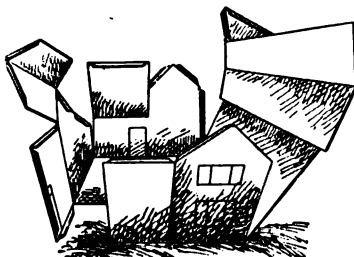


1. Modeltown Parsonage



2. Parsonage from the hall side

We draw on card and cut out the plan of the parsonage as shown in picture 10. As we bend it up into shape it will assume the position shown in picture 3. When we have glued the two sides to the back wall we shall have it like picture 4. Continuing a little further, we glue the triangular piece to the low sloping roof, and we see what it should be like in picture 5. Picture 6 represents a further stage, with one

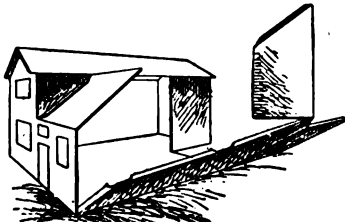


3. Folding up the walls

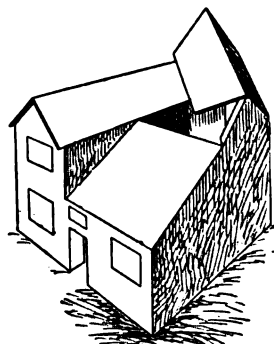
shall attach a projecting extension, which will provide room for a nice window-seat and also extend the view obtainable. The plan of this extension is given in picture 9, which is also half-scale,



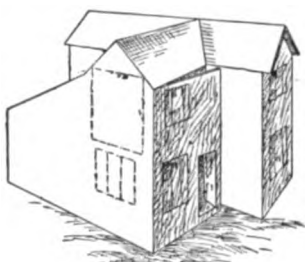
4. Sloping roof in position



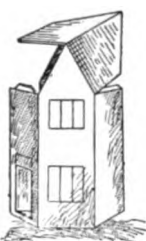
5. Main roof in position



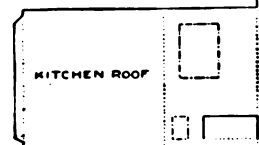
6. Folding almost complete



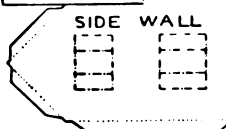
7. Parsonage folded and glued



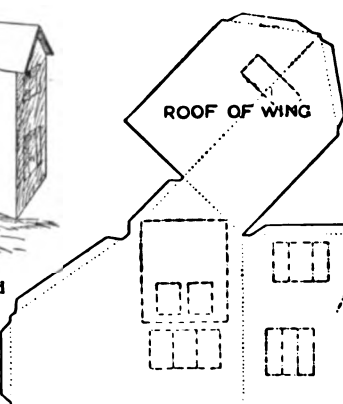
8. Bending up the hall



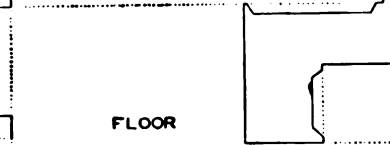
KITCHEN ROOF



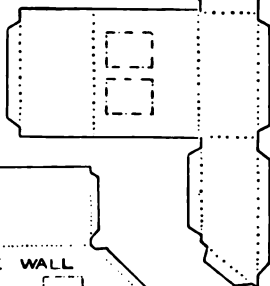
SIDE WALL



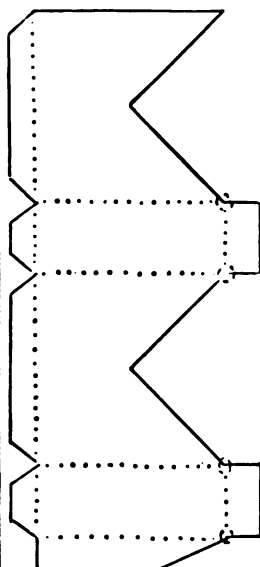
ROOF OF WING



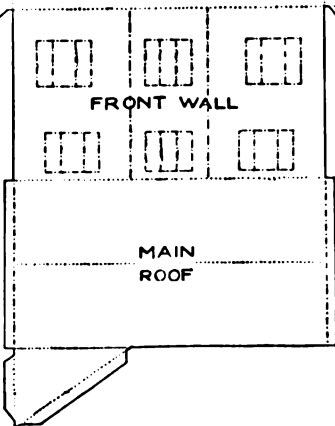
FLOOR



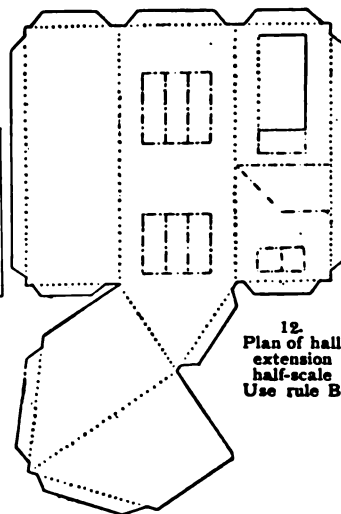
9. Plan of window extension half-scale Use rule B



FRONT WALL



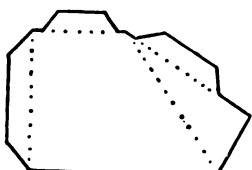
MAIN ROOF



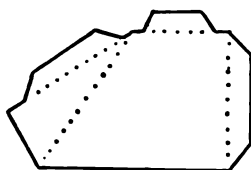
12. Plan of hall extension half-scale Use rule B

10. Plan of parsonage one-third scale Use rule C

11. Plan of chimney actual size



13. Plan of porch actual size



14. Plan of porch actual size



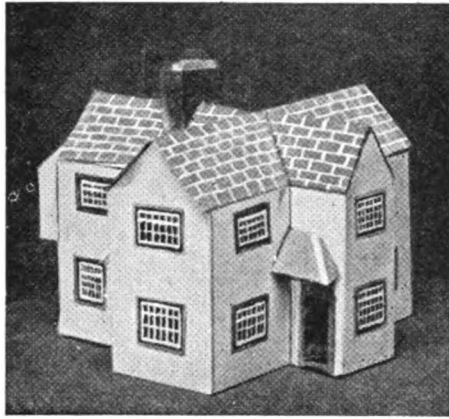
15. Bending up window extension



16. Folding the chimney

so that we again use scale-rule B. Picture 15 shows this piece from the inside as it is being bent up. After we have glued the slips of the sides to the front and allowed them to set hard, we glue the piece to the wall of the house in the place marked on the plan in picture 10. The view of the parsonage given in picture 2 shows the bay-window in its proper position.

The chimney comes next. Its plan in picture 11 is full size, so that we must use the full-sized rule both for taking the measurements from the picture and for making the drawing, or we may trace the plan, as we have seen how to do on page 445. In picture 16 the chimney is seen in the act of being folded. We have had good practice in making and fixing chimneys, so we know how to do it well. The two dotted lines which in plan 13 have a small circle at each end are cut half through, not on the side of the card on which the drawing is made, but upon the opposite side. In the plan in picture 10 is seen the place where the chimney must be



Photograph of Modeltown Parsonage as finished

glued on. There now remain only the two porch-covers to be made and put on. Their positions when fixed are seen in pictures 1 and 2, and the plans of them are given full size in pictures 13 and 14. We cut them out and glue them into place, and our parsonage is complete.

We shall have the parsonage with a red roof to imitate tiles, and we have already seen in previous lessons how to paint the roof red. Then, as usual, we shall make the windows a dark blue, to look like glass, and we shall leave the walls white, merely putting red lines round the doors and windows where the wood framing would be if the house were real. The doors themselves we shall have red also, and the two porch-covers we shall have green, as they would be

wood in a real house. The roof of the bedroom extension, however, we shall make red, like the roof. Our last picture is a photograph of a parsonage made as we have described.

We shall next begin to make Modeltown Farm, which will require three lessons.

A BONNET FOR A BABY DOLL

If you have a baby doll, here is a pretty little bonnet made of a straight piece of material, as shown in picture 1. It is gathered on one side as shown in picture 2, leaving a straight piece on each side. When the thread is drawn quite tight, just as it has been drawn in picture 2, join together the two little straight pieces which you have left on each side of the gathers, and you will have the little round shape shown in the next picture (3), which is the back of our bonnet.

On each point of the front a ribbon should be sewn to fasten the bonnet under the chin.

To trim the little bonnet, put a flat piece of lace over the front edge of the bonnet, as shown in picture 1, whilst a tiny ruche, or frilling, of Valenciennes lace sewn inside all round will give a soft finish to suit the dimpled face of dolly.

A round piece of cardboard, about the size of a fifty-cent. piece, should be covered with the material and adorned with lace or feather-stitching to cover the gathers.

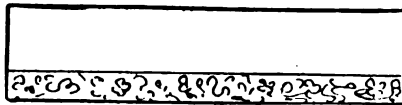
The two little bunches of ribbon

which adorn the top of the hat are not quite so easy to make as they at first appear. Like

everything else, there is a right way and a wrong way to make a ribbon bow, and the right way to make this one is to tie a little loop with strong thread (a long thread being required), bringing another loop by the side of the first one, then a third and a fourth, always twisting the same thread round and round the ribbon without using a needle, until the "chou" is quite formed, and is

big enough to be put on the bonnet, where it should be secured with a couple of strong stitches. Good milliners boast of the fact that a needle never passes through their ribbons, and their bows are as fresh as if no hand had touched them.

Nearly all good milliners first make and trim their hats in muslin, which can be cut, sewn, done and undone until the shape is perfect, and that is the way in which you must first try to make this little bonnet. Try in muslin or crêpe paper, which is soft and elastic, and lends itself admirably to this sort of work.



1. The pattern of the bonnet



2. The material gathered



3. The back of the bonnet



4. The finished bonnet

BALL GAMES FOR THE GARDEN

CATCH-BALL

ANY number of players can join in this game. It simply consists of tossing the ball from one to another, but it may be made more exciting if no special plan is followed as to whom the ball is to be thrown next. This keeps everyone on the alert, and a very good trick is to look at some other player than the one you intend to throw to. This nearly always leads to a slip on the part of the catcher.

THROWING THE BASEBALL

THIS game is good practice for boys. A place from which to start the throw should be marked by pushing a stick into the ground. If two are taking part in it, to see who can throw farthest, it saves time and running about if, after the first throw, the second player takes his stand where the ball has fallen, and throws back from there. Other sticks or twigs should be used to mark the distance of each throw.

NINE HOLES

THOUGH this game is called Nine Holes, the number varies with the number of players. The holes are made in the ground side by side, and are numbered onwards from 1, one hole belonging to each boy. Every hole has three or more small stones, called eggs, placed in it.

Ten or twelve feet away a mark is made, and one of the players rolls the ball from this mark towards the holes beside which the rest are standing. Directly the ball drops into a hole all the players scatter as fast as they can, except the owner of that particular hole. He snatches out the ball and throws it at one of his running playmates. If he hits his mark, the boy who is hit loses one of the eggs from his hole, and in turn throws the ball at another player.

Every one who is hit loses an egg, and so does the thrower, *if he misses*. The player who is last to lose all his eggs is the winner.

FIVES

THIS is a game for two or four players.

Draw on a flat brick wall a long chalk line, three feet six inches above the ground, and another one along the ground, ten feet from the foot of the wall. Then across each end of this last line, which should be about ten feet in length; draw another at right angles to it, and connecting it with the wall. These lines are to show where the ball is to bounce.

The players divide into two parties—we will call them A and B. A throws the ball against the wall, where it must strike above the chalk line, and when, on springing back, it bounces from the ground, B must strike it with his open hand, sending it against the wall again. Then comes A's turn to hit it on the bounce, and this is kept up, turn by turn, until someone makes a slip.

If the ball strikes beneath the chalk line, or rebounds *outside* the ground-lines, the side that did *not* make this mistake counts 1 to itself. The side that first reaches 12 or 24 marks wins, but any number may be chosen as the players decide.

EGG HAT

THE caps of the players are laid in a row on the ground at the foot of a wall; they should be tilted a little, so as to make it easier to toss a ball into them. The players then stand in a row at a line about eight steps away, and one of them pitches the ball at the hats. The moment this is done they all scatter, except the boy who owns the hat it has fallen into.

He must take out the ball as quickly as possible and throw it at one of the other players. If it hits him this boy must, in turn, pitch the ball at the hats.

But if the thrower misses him, a small pebble is placed in his cap as a bad mark, and when any player has missed so often that the number of pebbles in his cap equal the number of players, he is made to stand at a short distance while the rest throw the ball at him, each in turn. The game then starts afresh.

A pebble should also be added for every time a player fails to toss the ball into a hat.

CROSS-BALL

CROSS-BALL should be played by two players standing two or three yards apart. They should start with two balls, and should each toss at the same time so that the balls pass in mid-air. It requires quickness of sight and hand to keep this up, but a little practice will make it easy, and by-and-by a third ball may be added, when the effect is very pretty.

Chestnuts, or any small round objects that are not heavy, or too hard, are better for this game than balls, as they are quickly and easily handled. If the players count aloud as they throw, their actions will become more regular, and slips less frequent.

TRAP-BALL

THE trap can be made of a flat piece of wood about nine inches long and two or three inches wide, with a small hollow scooped near one end. Place this piece of wood on the ground, with some twig or small stone under it, so that the end opposite to the scoop is tilted up. Then lay the ball in the scoop and strike the lifted end sharply with a stick.

This will throw the ball into the air, and before it falls again the player must hit it with his stick. If he fails to do this twice, or hits it so that the ball is caught by another player, he is out, and the next takes his turn.

POSTURE

ALL the players stand in a large circle three or four yards apart, and throw the ball from one to another as rapidly as possible. Those who fail to catch it must remain as though turned to stone in the attitude in which they dropped the ball. The last to miss wins the game, and the rest must not change their positions until this winner has thrown the ball up and caught it ten times.

HOW TO FIND YOUR WAY IN A FOREST

MOST of us at some time or other during our holiday rambles have been lost in a forest or wood. Perhaps it is raining hard, and we are hurrying for shelter, or we want to catch a train, and, in an endeavour to save time, have left the pathway. Then it is that, unless we have a compass, or know how to read Nature's signposts, we may wander about aimlessly for hours.

But we need not be lost in the wood, for Nature has supplied us with an unfailing series of signs, which, if known and studied, show us the north, south, east, and west as clearly and truly as any compass.

Find a full-grown tree that stands slightly apart from its fellows. Now carefully look at the bark. It will be harder, lighter, and drier on the south side; while on the north side it will be considerably darker in tone, and often at the roots on the north side we shall find a clump of moss. Nearly all hardwood-trees, such as the oak, the ash, and the elm, have moss growing on the north side; while on that side the leaves are longer, of darker green,

and have lighter veins than those found on the south side. One of the surest ways of discovering the compass points is to find a sawn or cut stump. The rings of wood in the section will be found thicker on the south side than on the north, so that the heart of the stump is nearer the north side.

Stones that have rested in the same spot for some time usually have moss on the side facing north, while at best on the south side we shall find only a thin covering of harsh, half-dried moss. On the north side of a hill, ferns, mosses, and late flowers grow, and this side is at all times greener with vegetation. In winter nests of insects will be found in the crevices on the south side of trees with rough bark.

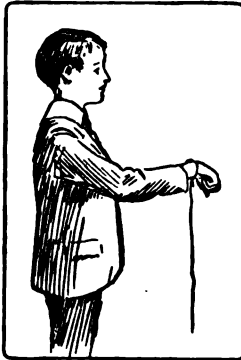
If we are on a marsh, small bushes will act as compasses, their leaves and limbs showing the same differences as we have seen on the trees in the wood. If we catch sight of a telegraph-pole, it is worth while to remember that the crosspieces of wood are usually on the side of the pole nearest the terminal city.

THE MAGICIAN'S JACKET

IT is always well for a conjurer to give his trick a name that is likely to deceive his audience, and we may impress our friends by calling the trick we are about to describe the magician's jacket.

The magician's jacket has nothing magical about it at all. It is only an ordinary jacket, such as any boy wears. In this trick it is not the conjurer who really does the trick; it is the member of his audience whom he asks to assist him, and who acts as an accomplice quite without knowing it. The trick is that the conjurer asks any one of his audience to tie his hands together behind his back with a piece of strong string, and after he has had his hands securely tied he takes off his jacket, and afterwards shows that his hands are

one end of it round one of his wrists, as seen in picture 1. Then, putting his two hands behind his back, he asks that his other wrist may be tied with the other end of the string in the same way, leaving just a few inches between the two wrists. It is while this is being done that the conjurer manages so that the friend who is making the knot acts as an unconscious accomplice. While the second wrist is being tied, as seen in picture 2, the conjurer *pulls the two wrists apart, so that the string between them is quite tight.* This causes the friend, unknown to himself, to tie a slip-knot, which, however, does not look like a slip-knot. Now comes the anxious time. First, the conjurer asks someone to fold his jacket back



1. One wrist tied



2. Both wrists tied

securely tied, just as they were before. This looks impossible; but we shall see how it can be done easily.

The conjurer takes a piece of string. It should be rather hard string — not the soft, pliable kind — but need not be too thick. The length should be about 18 inches. He then asks someone to tie

from his shoulders, as he cannot get his hands to his own shoulders. Then he stands back a little distance, so that the audience may not detect what he is doing. He puts one finger of the hand that was tied first behind the knot of the second wrist, as seen in picture 3, and a little pull will enable him to widen the loop



3. Slipping the hand

round the wrist, so as to be able to withdraw the wrist from the loop. When he has done this his two hands are no longer tied together, but he must be careful not to let the audience see this. He pulls off his jacket without showing his hands, and, as the jacket falls behind him, he must be careful to replace his free wrist in the free loop before showing that he has succeeded in getting his jacket off.

The best way for him to do this is to go down on his knees with his jacket behind him, and to do it while his hands are concealed by his jacket. Then, when he has got his wrist in the loop again, and has pulled up the loop tight as it was before, he comes forward, with

his jacket in one hand, and receives the applause which he deserves. He asks the friend who tied the knot, and anyone else who cares, to examine it, and say if it is as it was before. Then he asks someone to cut the string from his wrists.

This is an entertaining trick, and practice will enable any man or boy to hold his wrists so that his friend cannot help making a sliding knot. But it should be practised a few times before being shown in public. Nothing is more damaging to the reputation of a conjurer, whether professional or amateur, than a clumsily performed trick, and a little time spent in acquiring perfection is always advisable.

LITTLE PROBLEMS FOR CLEVER PEOPLE

THESE problems are continued from page 1512 and the answers below refer to the problems on that page.

HOW MUCH FOR A HORSE AND A COW?

76. "I have just sold nine horses and seven cows for \$1,500," said Farmer Giles. "I suppose you got more for each horse than you did for each cow?" asked his friend. "Yes, I got double," replied the farmer.

What was the price of the animals?

WHO WAS RIGHT?

77. "There is only one more wicket to fall," said a boy who was watching a cricket match, as the ninth man was going in. "No," said another boy, "there are two." "You are both wrong," said a third boy; "there are three."

Which of the three boys was correct?

HOW MUCH DID THE GROCER LOSE?

78. Said the grocer, "One of my customers has failed, and I have lost a good customer. I used to sell him tea at 60 per cent. profit

on cost price. He is going to pay 62½ cents on the dollar.

How much did the grocer lose?

WHAT WAS ITS PRICE?

79. "During sale week," said the merchant to a customer, "we will allow 20 per cent. off the prices marked on the goods, but next week after the sale is over we will allow only 5 per cent. discount." After the sale was over the lady bought something, and paid for it \$3 more than it would have cost during the sale.

What was the marked price?

WHAT WAS THE PRICE OF BACON?

80. "You can take this piece of bacon and 50 eggs for 6s. 8d.," said the provision dealer. "I have only 3s. 4d.," said the boy. "Well, take half of the bacon and 25 eggs," replied the man. "No," said the boy "I will take the whole of the bacon and 10 eggs." The provision dealer agreed to this arrangement.

What was the price of the bacon?

THE ANSWERS TO THE PROBLEMS ON PAGE 1512

70. The question is "What does y-e-s spell?"

71. The profit of three handkerchiefs sold at 4d. each is the same as the profit of one handkerchief sold at 4½d. Therefore the profit of one at 4½d. must have been three times the profit of one at 4d., and the difference between 4d. and 4½d. must have been equal to the profit of two at 4d. Thus the profit of one at 4d. must have been ⅓d., and the handkerchiefs must have cost 3⅓d. each.

72. If Brown had taken all the luggage he would have paid \$1.20 more excess than he did. Therefore \$1.20 would have been the excess charge on 120 lb., which is 1 cent per pound. As Smith paid 20 cents excess upon a total weight of 120 lb., his excess weight at 1 cent per pound, must have been 20 lb., so that 100 lb. was the weight allowed free. As Brown paid 30 cents excess for the share he took himself, that share must have been 100 lb. plus the number of cents in 30 cents, or 130 lb., so that the total weight of luggage was 250 lb.

73. Brown saved \$3.60, which, with coal

at \$6.00 a ton, was the price of 12 cwt. of coal. As he received 1 cwt. per ton more than exact weight, he must have ordered 12 tons and received 12 tons 12 cwt.

74. The boatman got 40 cents from the two extra passengers, but as his total profit was only 10 cents more by having the two extra passengers, the reduction of 5 cents each to the other passengers must have come to 30 cents altogether, so that there must have been six passengers in the original number or 8 in all.

75. If the church clock struck three in the same time as the town-hall clock struck two, the interval between the strokes of the town-hall clock must have been twice as long as the intervals between the strokes of the church clock. Thus the clocks would strike together at all alternate strokes. As they struck 1 together, the church clock would strike 3 when the town-hall clock struck 2; the town-hall clock would then have only one more stroke to make to tell the hour. Then the church clock would strike 5 as the town-hall clock struck 3, and the latter would have two more strokes to make to tell the hour.

Thus the time was 5 o'clock.

Answers to the above Problems are on page 1619

MAKING A SET OF BOOKSHELVES

IN proceeding with our carpentry work, we must not proceed too rapidly. We shall do better work if we make very simple things at first. Another point to keep in mind is the utility of the articles we set ourselves to make. Here we shall see how to make an exceedingly useful article—a set of hanging bookshelves—which we can attach to the wall.

Everyone can use an article of this kind, and everyone with ordinary intelligence and the necessary tools can make one. The sizes given in the sketches are good useful sizes, but the best sizes for the article to be made depend upon the space available for its accommodation. Thus everyone who makes the bookshelves from these sketches must first decide if these sizes are the best in his individual case, and if they are not he must modify the sizes given to suit his own case.

We have first to decide what kind of wood we shall use. We could use oak, beech, or birch—perhaps oak looks better than the other two for the purpose—but all these are hard woods, and it will be much easier for us to use a soft wood, such as pine. Hard woods are much more difficult to work. We can use soft wood, and after the shelves are made we can stain them to imitate any of the harder and more expensive woods.

In picture 1 we show one side of our hanging bookshelves with all the sizes marked on it. We first cut out two pieces of the wood we are using—pine, for instance—to this shape. They must be fairly strong, and we should make them so that the finished thickness shall be not less than one inch, so we had better use wood $1\frac{1}{2}$ inch thick and reduce it to one inch by planing it. The holes in the sides we can make with our chisel, and we must be particularly careful that each pair of holes is exactly in the same horizontal line, so that the shelves may be quite flat. We must

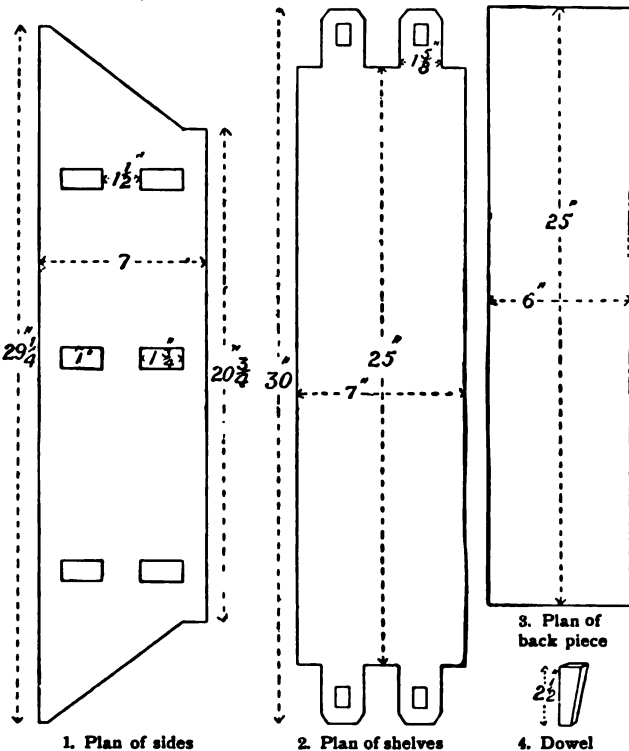
also see that the two sides are exactly alike. Having cut our two pieces, we must finish them carefully with the plane so as to have them true and smooth, afterwards rubbing them well with sand-paper, or glass-paper, these being two names for the same material. We should use No. 1 sand-paper first, rubbing the surface and edges carefully until they are as uniformly smooth as the sand-paper can make them, and then we use No. 6 sand-paper, which will give them the final touches. It is more important to have the sides smooth than it is to have the shelves smooth, because the former are more exposed to view.

Having made the sides, we turn our attention to the shelves, of which we shall make

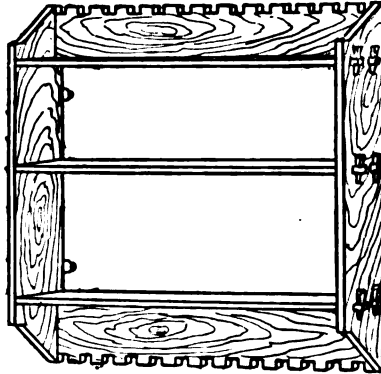
three. We shall make them all alike, and thereby simplify matters. Picture 2 shows the shape and the sizes to which we should make them. The thickness of these pieces when finished should not be less than $\frac{3}{4}$ inch and preferably $\frac{7}{8}$ inch, so that the wood, when we begin, should be thicker than this, to allow us to have this thickness when our planing and sand-papering are finished. Having made the shelves, we fit them

into the sides so that the ends go through the holes we made in the sides, and if they do not quite fit we must make them fit. We shall want twelve taper pins, or *dowels*, for the holes in the ends of the shelves to cause them to retain their position in the sides, and these pins we can easily make. It will be much better if they are of hard wood—say, oak, beech, birch, mahogany, or walnut—even if the sides and shelves are of soft wood. There is more strain upon the dowels than upon the other parts, and as they are smaller, strength is necessary. The shape and size of dowel necessary are given in picture 4.

The shelves would do as they now are, but would be liable to twist unless we



strengthened them, and we shall do this by two back pieces, one above the top shelf and another below the bottom shelf. Picture 3 shows the sizes for these pieces, both of which are alike. Having cut them out and finished them, we nail them on, one above the top shelf and one under the bottom shelf. Our set of shelves is now complete as far as carpentry goes. If we buy at the hardware merchants' 4 mirror plates, we can attach the shelves to the wall by their means. We must attach these mirror plates to the sides and not to the shelves. We put two at each side, as seen in picture 5. These would do well enough if they were put on to stick outwards, but in that case they would be seen when the shelves are attached to the wall.



5. The completed bookshelves

By putting them on as indicated in picture 5, the shelves will look much better when they are fixed in the place they are to occupy.

If we have used pine or other soft wood, we can stain the shelves any colour we prefer, and can imitate mahogany, rosewood,

walnut, or ebony. We purchase any of these stains in either small or large bottles, and apply it with a brush. Then we can put on some French polish if we wish to give the article an extra fine finish and can afford the modest expense. There are several other ways in which we can ornament the bookshelves. We may, if we like, make the top and bottom pieces "embattled" or "dentilated," as it is called, by cutting out pieces and leaving teeth-like projectors as shown in picture 5. We can carve the sides, or we can stain them with a pattern, using stencils, or we can burn some ornamentation, using a hot iron, or, finally, we can, if we wish, put some ornamental or imitation leather shelf-edging along the

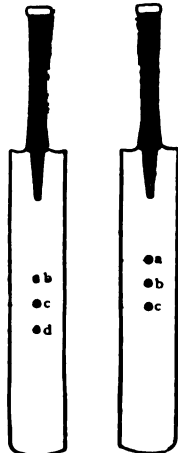
front of the shelves. Whether we decide to decorate in any of these ways or not, we shall have an article of wall furniture which we shall find very convenient, and of which we shall feel very proud, because we have made it ourselves.

THE MYSTERIOUS CHINESE BAT

THIS is a miniature cricket-bat, 6 in. long, as illustrated in the picture. In a row down its centre, about half an inch apart, are three small holes, visible on each side, and bored, apparently, right through it. But things are not always what they seem, especially in conjuring. A comparison of picture 1, representing a front view, and picture 2, representing a back view of the bat, will show how, in this case, the reality differs from the appearance. Of the three holes, A, B, and C, shown in the front view, only B and C are genuine, so to speak, A being a mere make-believe, going only half-way through the wood. On the other side of the bat, in a line with B and C, but half an inch nearer the lower end, is another dummy hole, D.

With the bat is used a little peg of wood, bone, or ivory, in length about three times the thickness of the bat, and just fitting comfortably into either of the holes B and C.

To show the trick, we, in the first place, call attention to the bat, asking the company to notice that there are three holes through it, as appears to be the case. We likewise exhibit the peg, which we may introduce with the remark that some of the company have no doubt seen the curious "jumping beans" which have been such a puzzle to naturalists, and that this little peg is a "jumping peg." Whether the motive power is the same in both cases you must leave the audience to decide.



1. Front view 2. Back view

The mysterious bat

We may here remark that whenever a conjurer can introduce in his "talkee-talkie" of a trick some little scientific fact having a resemblance, however remote, to the effect he is about to produce, he should not fail to do so.

If we can start people on a wrong scent, they are all the less likely to hit upon the true one.

But to return to our jumping peg. The performer puts it, from the front, into the hole B in such a manner that it shall project equally on each side. Holding the bat upright, he asks everybody to take notice that he has put it in the centre hole. He then lowers the bat as if to show the opposite face of it, but, as he does so, gives the handle a half-turn between his fingers. The effect of this is that *the same side* is still visible.

"Now," he says, "I shall command the peg to jump out of the middle hole and into the top hole." Under cover of a wave of the arm, he gives the bat another half-turn, thereby bringing the reverse side into view. On this side B is the *top* hole; and the peg appears to have jumped accordingly.

"Once more," he says, "we will place the peg in the middle hole." He then transfers it to C, which on the side now visible is the middle hole. Again he shows, apparently, both sides of the bat, then commands the peg to jump, and makes the final half-turn as before, when the peg is seen to have jumped into the lowermost hole.

THE WAY THAT THE FROGS JUMPED

HAVE you been able to find out how the three frogs jumped, or are they patiently waiting on their tumblers for the word of command, as in the picture on page 1609?

Of course the three frogs could easily jump into the places of three others, but that is not allowed; nor may a frog choose a seat which has had a frog on it, for each frog could leave a ticket behind with "Reserved" on it. Then, too, they must jump each on to a tumbler where it will be out of line with any other frog, either up, down, sideways or crossways.

You will notice that there is a frog in each row already, and so if three of them jump out of their rows into other rows, the frogs already in those rows must jump also.

How can it be managed? Well, there is nothing for it but trying each of the eight frogs in turn. Perhaps it will help if you give the frogs names, and when you have lifted them off the tumblers and are trying to find

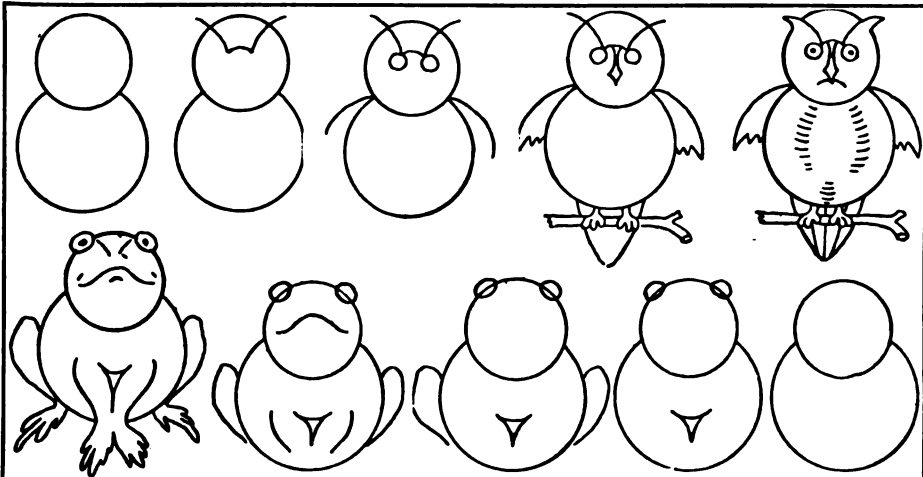
them seats you might put pieces of paper on the vacant tumblers, with the names of the frogs on them, so that you do not forget where they came from.

Suppose we name the frogs Jack, Dorothy, Alfred, Ethel, Lionel, Alice, Percy, and Jessie.

The three frogs who are going to jump are Alfred, in the third row from the top, Ethel, who is seated on the tumbler at the end of the fourth row, looking as if she were quite ready for a jump, and Percy, about the middle of the seventh row.

Alfred, Ethel, and Percy jump in this way: Alfred, who is quite a young, sprightly froggy, lands on the second tumbler in the seventh row down; Ethel, who was badly wanting a little jump, gently lands on the eighth tumbler of the third row, the one just above hers; Percy, who is noted for his high jumps, lands on the fourth tumbler in the fourth row. That is the only way in which the frogs could jump.

AN OWL AND A FROG MADE FROM CIRCLES



These pictures show you how to get an evening's amusement out of a pencil, a fifty cent and a five cent piece. Beginning at the left of the top row, we see how to build up an owl from two circles made by drawing a line round a fifty cent and a five cent piece; and the lower row, beginning on the right, shows how to make a frog.

THE ANSWERS TO THE PROBLEMS ON PAGE 1616

76. The price of one horse equalled the price of two cows, so that nine horses and seven cows would be the same price as 25 cows. If 25 cows fetched \$1,500, each cow was worth \$60, and as each horse was worth double, the price of each horse was \$120.

77. The third boy was right. When the ninth man went in, the eighth man was still batting, and the eighth, ninth, and tenth men had to go out.

78. Sixty per cent. of 62½ cents is 37½ cents, so that for tea that cost the grocer 62½ cents he had received 62½ cents + 37½ cents, which equals \$1. The bankrupt paid 62½ cents on the dollar, so as this amount was the grocer's cost price, the grocer lost nothing.

79. The difference between 5 per cent. and 20 per cent. is 15 per cent. The difference

upon the article purchased was \$3, so we must find of what sum \$3 is 15 per cent. Three dollars is 15 per cent. of \$20, so that the marked price was \$20, which would have been reduced to \$16 during the sale, but only to \$19 after the sale was over.

80. Since the whole piece of bacon and 10 eggs cost as much as half the bacon and 25 eggs, it is clear that half the bacon equals 15 eggs and the whole piece of bacon equals 30 eggs. As 50 eggs were offered with the bacon for 6s. 8d., the same sum would buy 80 eggs (30 + 50). Thus the eggs were one penny each, so that the 50 eggs offered with the bacon represented 4s. 2d.

Thus the price of the bacon may be known by deducting 4s. 2d. from 6s. 8d., and it was therefore 2s. 6d.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 1717

A DOG FOR OUR TOY ZOO

THE dog which is shown in the picture was made of a piece of curly brown astrachan cloth, but if you are going to trace this pattern, and not enlarge it, you should choose a less clumsy material. He has no nose-piece, and the leg-pieces are cut off, like the lion's, a little below the body, and left open at the dotted line. The wood for each leg is about two inches long, and as thick as a *thin* slate-pencil. It is wrapped in a piece of the stuff half an inch longer than itself at one end, and securely fastened to the wood at the other, so that the little stick cannot slip out of its case, as described for the making of the lion. Astrachan does not fray, and may,

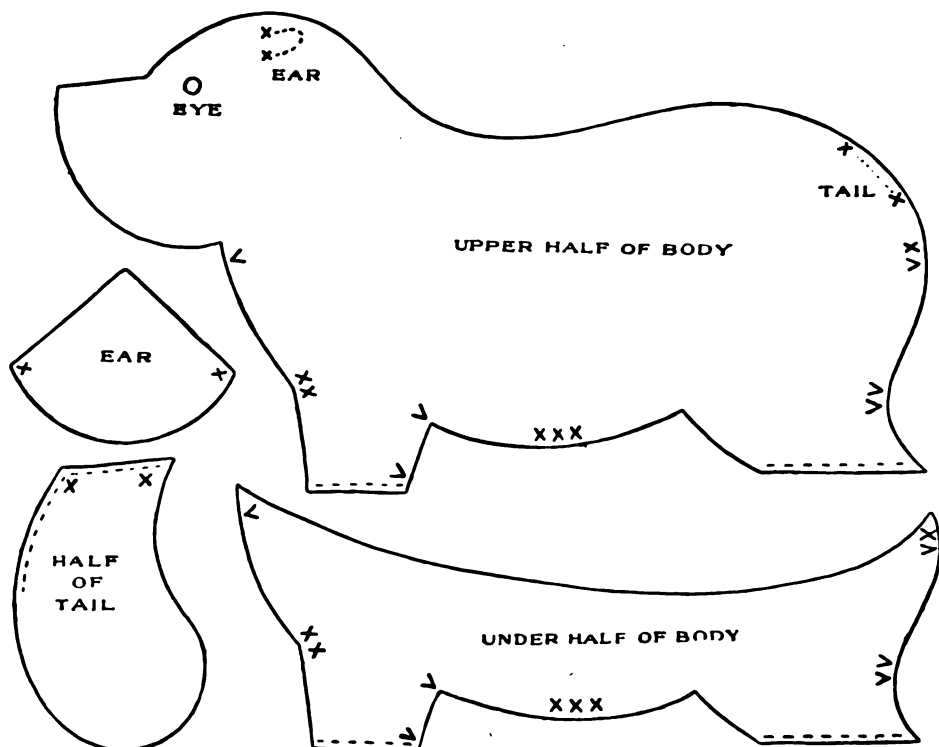
to form the foot. When you fix the legs into the holes left for them, be careful that the toes all point the right way. The edges of the thigh parts may be carefully hemmed down raw-edged on to the leg, and any of the thigh part that is too large must be kept to the back, and stitched across to form a joint.

The dog's tail can be stitched up on the wrong side, and if it is left open at the dotted line it can be turned, and after a little stuffing has been put in, this opening can be finished on the right side.

The tail should be put on before the back seam is stitched up. The dog's ears are left raw-edged, and not lined. The nose is a bead, sewn on and covered



The dog for our toy Zoo



for the legs, be sewn raw-edged on the right side. The piece of stuff that is too long must be rounded off, sewn round, and caught back by a stitch or two at right angles with the leg

with Prout's glue, in which two nostrils are pierced with the point of a pair of scissors while it is soft. The eyes are jet beads, and the mouth is shiny black thread.



A NEW SONG OF A SHIRT

WITH fingers weary and worn
With eyelids heavy and red
A woman sat, in unwomanly rags,
Plying her needle and thread,—
Stitch! stitch! stitch!
In poverty, hunger and dirt;
And still with a voice of dolorous pitch
She sang the "Song of the Shirt!"

"Work — work — work —
Till the brain begins to swim!
Work — work — work —
Till the eyes are heavy and dim!
Seam, and gusset, and band,
Band, and gusset, and seam, —
Till over the buttons I fall asleep,
And sew them on in a dream!"

Needlework is as old as human history. It began with the crude apron of fig leaves that Eve sewed for herself in the Garden of Eden. Our prehistoric ancestors used thorns to join their garments together, and many of the Indians and the Eskimo of today still use this primitive method of sewing. We learn from the Bible that needles were used in Palestine before the Tabernacle was built. Yet, strange to say, it was not until the eighteenth century that anyone thought of superseding manual labour in the matter of stitching.

Women who earned their bread by sewing wore their eyes — yes, their lives — out in trying to make enough to keep body and soul together. The pay for piece work was small and at the best, working from early morning until late into the night, the amount of sewing accomplished was necessarily very little. In 1844 Thomas Hood wrote and published his famous "Song of the Shirt," picturing the pitiful drudgery of the poor women who were forced to earn a livelihood by their needles.

A AMERICA'S CHIEF CONTRIBUTION TO CIVILISATION

It was a Yankee who invented the first practical device for mechanical

sewing, yet the present sewing machine was the outgrowth of the efforts of many clever men of many countries. For a hundred years or more before the first successful machine was placed on the market, the idea of such a machine had been the cherished dream of a number of inventors.

WHAT A GERMAN, AN ENGLISHMAN AND A FRENCHMAN CONTRIBUTED TOWARD THE GROWTH OF A GREAT IDEA

The earliest known attempt at a mechanical sewing device was patented on July 24, 1755, by a German tailor by the name of Charles F. Weisenthal. It was a queer little machine, with a needle having two points and an eye in the middle.

The next sewing machine was made by Thomas Saint, a London cabinet maker, who described it as a machine for "quilting, stitching and making shoes, boots, spatter dashes, clogs and other articles." This leather sewing machine, rude and impractical as it was, was the real forerunner of the useful American invention.

An Englishman named Duncan and an American clergyman by the name of Dodge next tried their hands at the matter. The first patent issued in America was procured by a man named Lye in 1826. All records of his machine were destroyed in the fire that burned the Patent Office in 1836.

It was a Parisian who made the next really valuable contribution toward the movement. His name was Barthémy Thimonier, a picture of whose machine can be seen on another page. How queer and awkward it looks! Yet eight hundred of these machines, made of wood were said to have been used at one time in Paris for the making of army clothing. However, as may well be imagined,

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it had far too many defects to become more than another important step in a great movement.

In the years that followed several other inventors gave all their thought toward the completing of a sewing machine that would be of real help to mankind — among them, Walter Hunt, George A. Arrowsmith, John J. Greenough, R. W. Bean, George R. Corliss — all Americans.

ELIAS HOWE AND THE FIRST PRACTICAL SEWING MACHINE

The honour of producing the first really practical sewing machine belongs to Elias Howe, a humble mechanic in a small Massachusetts town. When a lad of twenty-one, the idea occurred to him of passing thread to and fro through a cloth and securing it on the other side. Having no money to experiment with, Howe's tests were necessarily of a very limited kind, made in the little garret that he called his home.

One day, however, Howe went to board with an old schoolfellow named Fisher. The young inventor was bubbling over with his wonderful new idea. Surely he would succeed if he only had the money. Fisher offered him the loan of \$500 to help him in carrying out his plans making an agreement whereby he was to receive half the profits if the invention proved a success. "The one provided brains and the other money and between them in April, 1845, they finished the first real sewing machine."

Wild with delight at his success and fully confident of his ground, Howe began to "boon" his invention by challenging five of the most expert hand sewers in a large Boston clothing factory to a sewing match. Howe boldly undertook to sew five strips of cloth on his new machine before any one of the men had completed one strip. His challenge was greeted with jeers of derision. The men smiled confidently to themselves as the match opened. Presently their smiles vanished. They bent feverishly over their work. The machine was gaining — gaining. The time was up before the men half realised what had happened.

Five strips of white sewn cloth lay beside the new machine. The men looked at them dazedly and then at the half completed strips in their own hands. An indignant murmur swept over the crowd of workmen gathering watching about. It slowly swelled to a hoarse ominous cry:

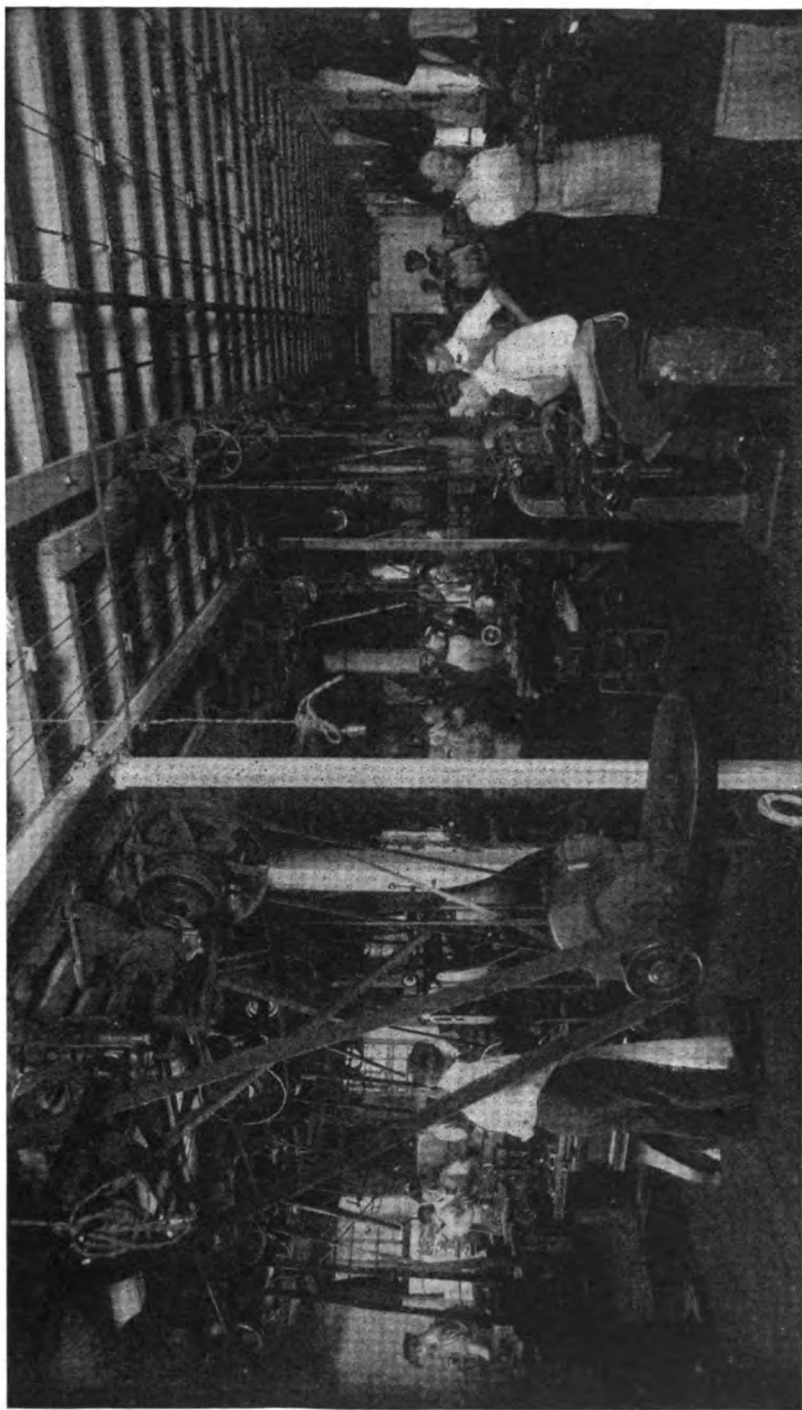
"Smash the machine! Smash the d—— machine! It will take the bread out of the mouths of honest workmen."

It was with great difficulty that Howe, his precious machine tucked under his arm, finally escaped from the angry mob.

The following five years were ones of poverty and struggle to Howe. He and his partner patented the machine and for a while Howe toured the country, exhibiting it at fairs for a trifling admission fee. People flocked to see the "clever toy," but no one would believe that it could really do practical work. Failing to secure recognition of its value in the United States, in 1846 Howe carried his machine over to England. There a London staymaker bought the right to patent it and engaged Howe's services at the rate of \$15 per week. Howe failed to accomplish what the staymaker wanted, and, after wasting a good deal of money in experiments, the man abandoned Howe and his invention in disgust. Howe was thus left stranded again and he returned to America poorer than ever, leaving his machine behind him in pawn in order to get the money to pay his passage home. And yet there were "millions in it!"

When Howe got back to the United States he found a number of ingenious people engaged in producing, or experimenting in sewing machines, and some of them were infringing on his own patent rights. After much heart-breaking delay, Howe somehow succeeded in raising enough money to redeem his pawned machine in England, and then he began actions against all who were infringing on his patent. He spent long years in hard and bitter legal fighting, but in the end he won, and obtained the right to secure a royalty or percentage from several

A FACTORY WHERE THOUSANDS OF MACHINES ARE MADE



The first sewing machines were built in small shops and the work was done almost entirely with hand tools. The demand for the machines has increased until American machines are sold in every civilised country and in many countries where the people have hardly escaped from barbarism. The picture represents only a small part of one room in a great factory where thousands of machines are made every year. The parts are made so accurately that a machine can be put together and started running in a few moments. Very rarely does any of the parts require attention though, of course, they must be adjusted. There are many other factories as large as this.

sewing machine manufacturing companies. After all his poverty and brave-hearted struggle under every sort of difficulty, money poured in, and Howe lived to be a very successful and wealthy man.

WHAT A POOR BOSTON MECHANIC DID FOR THE WORLD

Meanwhile clever men in England and America were busy trying to simplify the sewing machine then on the market. Morey, Drake and Fisher in England; and Wilson and Singer in America were doing all in their power to make the invention practical and easy to work.

The sewing machine was still a heavy, awkward thing when Isaac Singer, a poor millwright employed in a Boston factory, first took hold of it. One day when Singer was at work, a sewing machine came to the factory for repairs. The young mechanic carefully inspected its big, clumsy mechanism.

"I believe I could make a better sewing machine than that myself," he exclaimed with deep conviction.

From that moment Singer became a dreamer of dreams and the subject of his dreams was a Sewing Machine — a sewing machine that would sew with a marvellous ease and speed and lightness. Full of enthusiasm, he induced two other Boston workmen to invest in his visionary enterprise. One gave him all his capital — forty dollars; the other loaned the use of his tools and workshop.

Day and night Singer toiled away upon his wonderful idea — toiled absorbedly — feverishly — for the time was short and "the machine must be built on forty dollars or not be built at all."

The crisis was reached at last. One sultry August night in a little room in a back Boston street, three men met — three men whose all was invested in the little machine that lay on the table before them. The hour of trial had come! The machine had been put together that day and it lay before them complete in its smallest part. Hope, eagerness, anxiety struggled in the faces of the men, as they bent for-

ward breathlessly. Singer carefully adjusted the working gear. He started it going. *It did not work!*

First one and then the other of his companions left the broken-hearted inventor with his failure, alone in the shop at midnight. So this was the end of all his dreams — a useless mass of iron and steel — a machine that would not work! Yet surely, surely, his main idea was right. Sick with anxiety and want of sleep, and yet with a clinging faith in his idea, the man worked over the machine. At last, worn-out and half dazed with sleep, Singer turned his back on his golden dreams and started through the cold gray of the morning for his lodging. Half way home he stopped short. Wait! Wait! Could it be that he had it!

"The loose loops of the thread are all on the upper side of the cloth," he muttered to himself.

Like a flash he knew what the trouble was. His mind was alert and clear in an instant. Almost at a run he returned to the shop. With shaking fingers he re-lit his lamp. His breath came in short, feverish gasps as he bent over his machine. He carefully tightened a delicate little tension screw. In a few minutes the Isaac Merritt Singer sewing machine was working!

OTHER IMPROVEMENTS

Singer was the first to apply the use of the foot treadle to the sewing machine, replacing the old fashioned hand crank wheel of former machines. A few years later W. E. Baker, and W. O. Grover patented a machine that made a double chain stitch and shortly after James E. A. Gibbs put his single chain stitch machine on the market.

Since the days of Elias Howe and his invention of the first practical sewing machine the number of patents taken out for sewing machines has been legion — certainly not less than one hundred thousand — and probably more. There is scarcely a household in our land without a sewing machine. In the sewing machine we have America's answer to Thomas Hood's "Song of the Shirt."

The Child's Book of NATURE

WHAT THIS STORY TELLS US.

THE sea-birds are in some ways the most wonderful of all living creatures. Some of them can move as quickly on foot about the land as many of the animals. They swim as lightly as corks in the deepest seas, in the fiercest storms. They dive like fish. To crown all, they fly with an ease and grace and strength which nothing else can match. They find their food where no land animal, no matter how powerful, could live for more than a few moments. No matter into what seas our ships go, there they find some sort of bird giving life and beauty to the scene. The powers of these birds make man feel that Providence, when it made him lord of the earth and the waters, was very mindful of the needs of the inferior creatures. Here we read of some of the most wonderful of these birds.

THE BIRDS OF THE OCEAN

IF we all had to vote for a king of the sea-birds, we should probably agree to crown the albatross. It is not the bravest of the sea-birds. A sea-eagle will readily beat it; so will some of the vicious gulls. But for the perfection of flight, for the beauty of its appearance as it sails the air, and for its unwearying strength, the albatross must have the first place. There are seven species of it, one of them so dull in colour that it is commonly called the sooty albatross. The one most generally known is the albatross which, from its great flight, is called the wanderer.

It is about 4 feet long, but its outspread wings measure from 10 feet to 17 feet from tip to tip. They are not great broad wings, like those of the eagle, but narrow, though, of course, very strong. With this great spread of wings the albatross cannot easily get a start on level ground. It likes a rock as a starting-point, unless the wind be blowing. In the latter case the bird faces the wind, and rises against it like a kite.

One day a traveller, walking over an island where many albatrosses were hatching their eggs, found that one bird had dropped into a pit. This pit was 60 feet across, and 30 feet deep, but the bird could not fly out. There was not room enough for its great wings to raise it into the air, and the traveller, climbing down, had no difficulty in catching it and returning it to the high ground, where it could fly. It is in the air that the

CONTINUED FROM 1522



albatross appears at its best. On land, where it is nesting in thousands and thousands, the bird seems as dull as a penguin. But in the air it is a king indeed. A few flaps of its mighty wings send it high into the air over the sea. There it sails like a beautiful ship of feather and muscle. It barely moves its wings at all. It seems to hang in the air, and to float and glide without any effort. Men have watched it for hours and not seen it shift its wings.

Of course, it *does* move them, if ever so slightly; for if it makes the wind carry it, as it is said to do, it must make slight alterations in the position of the wings to enable them to catch the wind and make it carry it in the direction it wishes to follow. But for straightforward flying it is just as much a master. One has been known to follow a swift steamer for hundreds and hundreds of miles, circling in great flights round and round the vessel, on the look-out for any food that might be thrown overboard. The albatross likes live fish, jelly-fish, and other marine creatures; but it is not dainty. It will eat the flesh of a dead whale, or anything too bad to be kept on board a ship. In this way it acts as an ocean scavenger. When it has fed, it swims, dazed, upon the water, and may easily be caught, unless, as often happens when it is pursued, it throws up its food so that it may fly off.

The nearest allies of the stately albatross are the gulls and the petrels and the auks. Indeed, the albatross is

the greatest of all the petrels, although there is one, called the giant petrel, which is not much smaller. The most interesting of these birds of many varieties are the smallest, the little stormy petrels, or Mother Carey's Chickens, as the sailors call them. They are the tiniest of all web-footed birds, being no bigger than large swallows.

The nature of a bird is often told in a common name, and the name "petrel" has a history. Petrel is another form of Peter, and the bird gets this name because it seems to walk upon the water, as Peter the Apostle was permitted to do. No matter how rough the sea or boisterous the gale, there the little bird is to be seen, far out at sea, lightly tripping up and down the waves. It flutters its fine wings only just enough to give its feet the support which they need to keep its light little body afloat. Thus with swift, light feet and fast-flapping wings it skims the waves, greedily feeding upon the little creatures which the stormy waves bring to the top of the water, just before and just after a storm. Those are its most active times, and sailors, noting this, think that the bird causes the bad weather at sea.

THE PETRELS WHOSE HOMES AND HABITS HAVE PUZZLED MEN OF SCIENCE

Even learned men do not know nearly all that there is to be learned about the petrels. It was always supposed that the fork-tailed petrel of Canada never left the vicinity of the Canadian coasts, but suddenly one turned up in England. Another man found the same breed of birds in the Sandwich Islands, and thought that they lived only there; but since then specimens have been received at the British Museum from four different parts of the world. Another petrel variety which was supposed never to leave Fiji has been found in Wales.

The stormy petrel, like the shear-water, another of the same family of birds, may be seen in large flocks far out at sea, enjoying the stormy weather. Most of the petrels skim the waters, but the diver petrels go far down, and dash among the fish which do not come to the surface. The Cape pigeon is really a petrel. Most of the small petrels nest in little burrows, but they lay their eggs on rocky cliffs, bits of

stone serving for a nest. When sitting on its nest, it looks exactly like a chequered homing pigeon, but not when we see that its feet are webbed. The beautiful showy petrel rests on rocky ledges on the sides of dizzy precipices, content with bits of rock and pebbles for a nest.

THE UNPLEASANT WAY IN WHICH THE GIANT PETREL KEEPS OFF ENEMIES

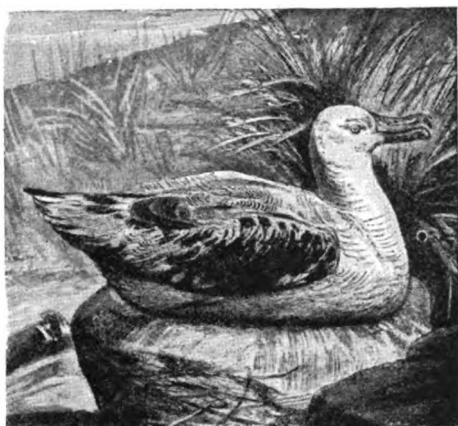
The Antarctic giant petrel, which weighs eight pounds, makes a large nest of stones, and, like the albatross, does an unpleasant thing if attacked. It has the power to withdraw food from its stomach, and to scatter it over the man who goes near. Even the young ones when alarmed can squirt nasty oil from their nostrils to a distance of three or four yards. The giant petrel loves penguin eggs and young penguins, and works havoc among wingless birds.

But the giant petrel is less feared by the penguins than the sheath-bills, which have an uncommon share of the trickery that many of the sea-birds possess. They are not nearly the size of the penguins or the cormorants, being more like large white pigeons, yet they are terrible worries to these large birds. The sheath-bills make their nesting-places in the same rocky, frozen Antarctic islands where the penguins and shags or cormorants make theirs. Now, as the penguins or shags sit upon their nests, a couple of sheath-bills will saunter along, hunting together as wild animals hunt. One of the robbers will walk in front of the nest, and there engage the attention of the sitting bird, causing it to reach forward to attack the sheath-bill nearest her beak, and in so doing, leaving her eggs uncovered at the back. The sheath-bill in the rear will then make a grab at the eggs with its sharp bill. The two robbers then march on, and change places at the next nest, so that both, by taking turns, get their share.

THE PIRATE SKUA, WHICH STEALS THE FOOD OF OTHER BIRDS

A still more audacious foe is the skua. The skuas are a form of gull, and the third largest of the sea-birds. First there is the albatross, which measures 4 feet from beak to tail; next comes the giant petrel, which is 32 inches long and 5½ feet across the wings; then comes the skua, measuring 24 inches and more, and with a splendid stretch of wing. It is a family of six species, of which four

GREAT BIRDS THAT HUNT IN THE SEA



Though a goose-like bird on its nest, the albatross, when flying, is the picture of strength and grace.



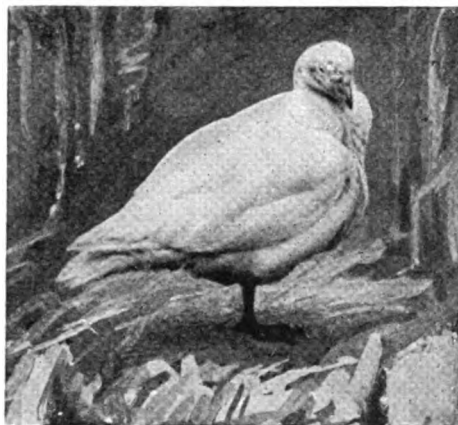
Seen on the rocks, the Cape petrel resembles a pigeon, but its feet are webbed and it swims like a sea-gull.



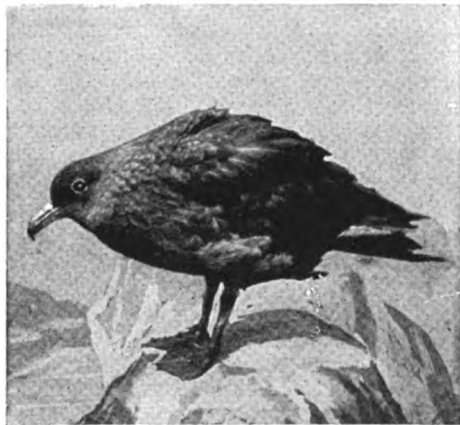
When winds lash the seas, tiny sea animals are washed to the surface. The stormy petrel, seen here, feeds on these, running and flying on the surface of the waves.



Next in size to the albatross comes this giant petrel. Its nostrils form horny tubes along the upper surface of the beak. Its wings measure nearly six feet across.



The sheath-bills are birds which can be found on the land in the great, cold Antarctic regions. They are clever, cheeky birds, and cunningly rob other birds' nests.



Skuas are scavengers. They eat decayed flesh, but young penguins and other young birds too. Their webbed feet, shown here, have claws, with which they fight.

make their nesting-places in the frozen North, while the other two are far-scattered over the warmer seas. But wherever they are, the same nature rules them. Their proper food is fish, but they eat also the flesh of whales which have been killed; they will eat dead birds and animals; they eat the eggs of other birds, and find young birds quite to their liking.

Seeing that skuas like fish, it might be thought that they would prove expert fishers. But that is not so. They are pirates who rob other birds of their gains. Although their feet are webbed, they have sharp claws, and use these to attack other birds. When a small gull catches a fish, the skua makes a dart at it in the air, and attacks it with such fury that the smaller bird is glad to drop its fish and flee. No sooner does the fish drop from the mouth of the gull, than the skua descends like a hawk, and snaps it up before it can reach the water. Thus, where there are many small gulls and terns on the look-out for fish, there, too, may many skuas be expected, ready to steal the food from their smaller relations.

THE BIRDS THAT EAT DEAD BIRDS, AND THE GULLS THAT FOLLOW THE PLOUGH

They are the scavengers of the penguin rookeries. Many penguins are killed in the course of the year, and their bodies left to become corrupt. Skuas pounce down upon the dead birds and devour their bodies. They help, too, to get rid of the dead bodies of animals on land and in the sea. Flesh and fish are food to them, and nothing else. The effect is, however, to prevent dead bodies of beasts and birds from making the air corrupt. All things die in time; but no matter where death occurs, there is some form of life to consume the remains, unless, indeed, the body be sealed up in ice or mud. It seems a merciful part of the plan of Nature not to have the evidence of death about, and the fierce birds with hearty appetites are but her agents in carrying out part of the work.

Many of the sea-birds are never seen by people who do not make voyages across the ocean. That is not the case with the gulls. Some of these come far inland; though their proper home is the sea, yet they like grubs and worms and insects that live in the soil. By

constant observation they have found out that when the farmer ploughs his land, these things, which form good food for gulls, are turned up. So it is quite common to see a crowd of splendid white gulls gracefully following the plough to pick up the living things which the plough brings to the surface. This, of course, happens only near the sea, or near some big lake; yet gulls dwell far in the interior, as about the prairie lakes of Dakota.

BIRDS THAT MAKE ANIMALS BLIND AND THEN DESTROY THEM

The small gulls are content with a diet of worms, and so forth, but the large ones are as bad as the bad ravens and the eagles. They eat rats and mice, which is just as it should be; but when they kill and eat useful birds, then their visits become unwelcome. Still worse is it when they attack lambs and baby deer. They peck out their victims' eyes, so preventing the poor creatures from seeing a way of escape, and causing them great agony. The large black-backed gull is the worst of the thieves and murderers. This is a bird measuring 28 inches from beak to tail, and that it is very powerful, the fact that it can kill lambs and birds is sufficient evidence.

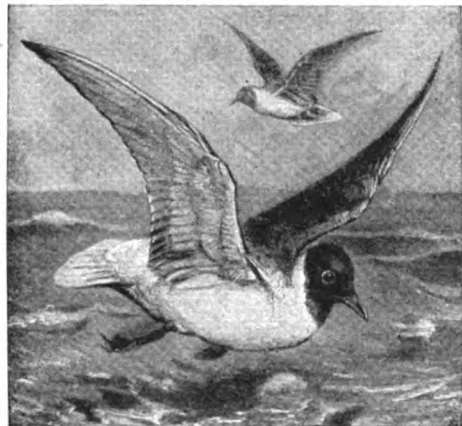
Many gulls have become regular visitors to London. They are to be seen flying along the Thames nearly all the year. They are very tame, and it has become the custom for people on the Thames Embankment to feed the gulls with fish and other forms of food.

The black-backed gulls, the black-headed gulls, the herring gulls, and the kittiwake gulls are all to be seen in winter, at the seaside, haunting the rivers and marshes, or even in the fields far inland, in spring and autumn. Some of them, like the black-headed and black-backed gulls, make their nests among marshes, where they build with rushes and grasses high enough for the nest to be free of water.

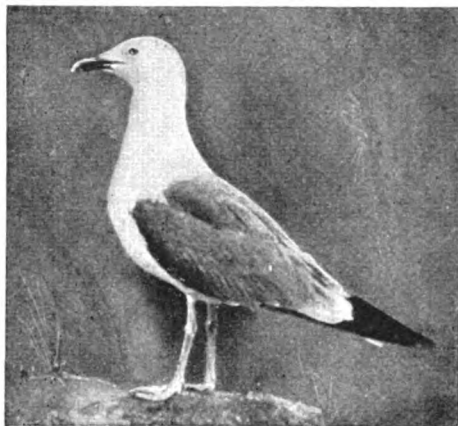
THE GULL WITH A NEST OF SEAWEED, AND THE SEA-SWALLOW

The kittiwake gull, so called because its cry sounds like "kitti-wake," builds its nest of seaweed on tiny ledges of rock high up on cliffs overlooking the sea. Gulls like ours, which nest here in the spring, have their relatives abroad which sit on their nests and hatch their eggs

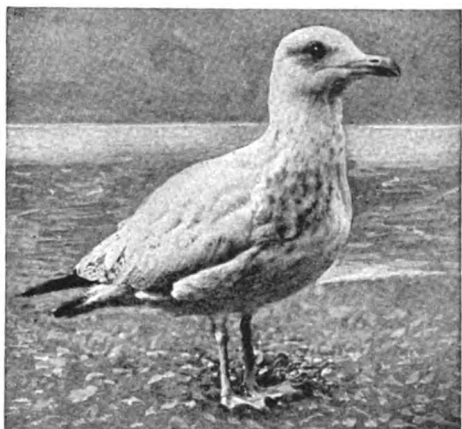
BIRDS THAT CATCH FISH AND KILL LAMBS



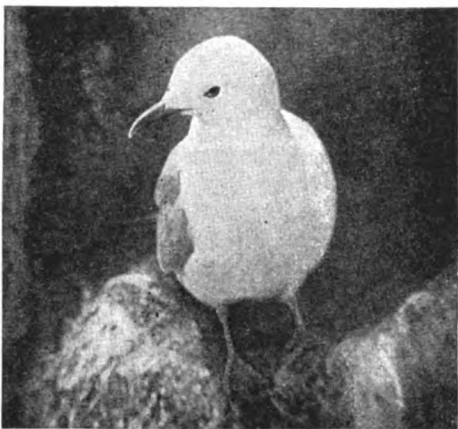
The black-headed gulls are generally to be seen off our coasts. They make their nests in the marshes.



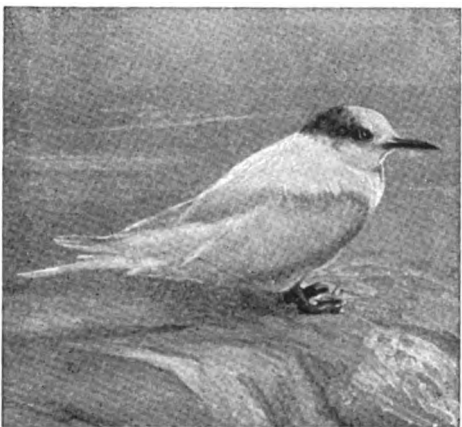
Black-backed gulls like sea-food, but are strong, savage birds, and kill lambs by pecking out their eyes.



Herring gulls follow shoals of herrings, and, diving into the water, catch them as hawks catch their prey.



The kittiwake gulls spend their days on the sea, and have their nests in the wildest, rockiest places.



The tern is the smallest of the gulls. It flies and darts so swiftly that it is called the sea-swallow. Its forked tail increases its likeness to a swallow.



The black tern is one of our common inland birds. It makes, in marshy places, a strong nest of loose vegetation which can float if water rises near it.

The photographs on these pages are by Lewis Medland, W. P. Dando, R. B. Lodge, and others.

with snow and ice all around them. One family of gulls we have not yet thought of. That is the tern, or sea-swallow. The name sea-swallow gives us a good idea of its looks. It has a longer, straighter beak than the ordinary gull, and the tail of most species is long and forked, like that of the true swallow. Terns are even more numerous than gulls, and are to be found near the sea in all climates. They fly with the darting speed and skill of the land swallow, but, though as eager as their namesakes to snap up insects, they live chiefly on fish.

HOW THE SEA-SWALLOW'S ENEMY ROBS IT OF ITS FOOD

As we have noticed the long beak of the tern, the beak of the skimmers may help to keep their peculiarity in mind. Their bills are long, but the lower half is much longer than the upper. The two halves work like a pair of scissors, and the birds are called scissor-bills. When flying low over the water they keep the long lower half of the beak in the water, searching for food in this way as they fly. As the tern is so numerous and such a busy feeder, naturally it has enemies. The most daring is, perhaps, the tropical frigate bird.

This is a bird which flies far out to sea, not to fish, but to rob other birds which have fished. It attacks the terns and gannets, or solan geese, as the skua attacks his victim, and frightens the little sea-swallow or the big gannet into throwing up at least a share of the fish which it has caught. Sometimes the frigate bird has been seen to hide in trees on the cocoa-nut-bearing islands, where many of these birds make their homes, then sail out at night to meet the home-coming wanderers, and make them give up their food. If the gannet proves at all unwilling, the frigate bird takes him by the tail and gives him a good shake, which always has the desired result.

THE HANDSOME TROPIC BIRD WITH IVORY FEATHERS, & THE LITTLE AUKS

A bird in many ways resembling the gull and the frigate bird is the handsome tropic bird, one of the loveliest of sea-birds, with ivory feathers tinged with pink, except at the tips of the wings, where the feathers are black; and around the eyes, where again the

feathers are black. The tropic bird has two elegant streaming feathers in its tail, more like the feathers of a pheasant than those of a bird which passes its life seeking food in the boundless southern ocean.

Sea-gulls are the descendants of the birds from which our field friends the plovers came. The plovers are older than the gulls in the history of creation, and it is pleasant to find both branches of the family flourishing.

When we come to the auks we find a different story. We have the razor-bills, the guillemots, and the puffins still prosperous, but the chief of the auks, the famous great auk, is no more. It forgot how to fly, and men killed every member of the race, though the bird once thrived in millions. The other members of the family have kept their wings for flying, and, as they nest far in the North on high sea cliffs, they are safe. In the old days great auks were occasionally found nesting with the razor-bills and guillemots. The smaller birds did not seek such heights then as they do now, in this country at any rate, or the great auks could not have reached their nesting-places. Birds of different sorts still nest together, while others have nothing in common.

WHY THE GUILLEMOT'S EGG DOES NOT ROLL OVER THE CLIFF

Thus, we find one station, or one line of ledges or rocks, occupied by the nests of the guillemots, another by the razor-bills; the puffins take a third distinct series of rocks; the kittiwakes make the fourth part of the colony, while the highest and most difficult rocks of all are occupied by the herring gulls. There seems much confusion when the birds are arriving, and courting, and claiming their nests, but in reality all is in order, and each species of bird keeps together.

Although they live close together, the razor-bill and the guillemot have different methods of nesting. All that the razor-bill does is to find a rock which affords a rough protection for the one egg that it lays. The egg is deposited upon the bare hard rock, but there must be a nook or cranny in the rock to prevent the egg from rolling away and crashing down over the cliff. The guillemot needs not even this scanty guard. So long as the rock is high

SOME BIRDS THAT CAN FLY AND DIVE



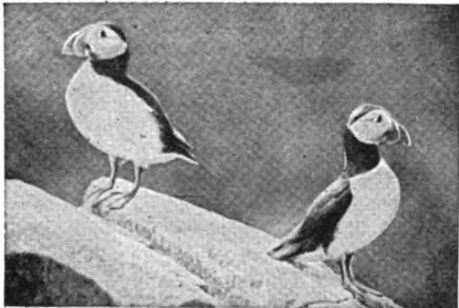
Frigate birds fly beautifully, but they are lazy and rob other birds of the fish they have caught.



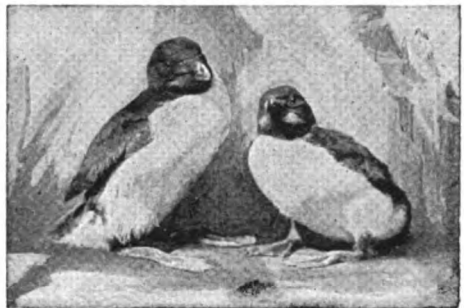
The little auks make their nests in the frozen North, but take their little ones, when hatched, to warmer seas.



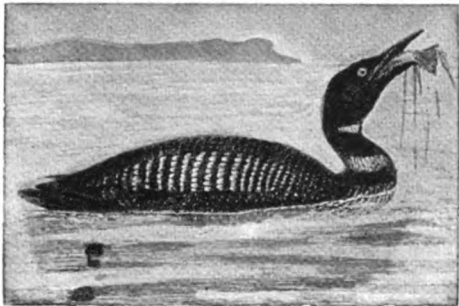
Guillemots, when grouped together at their nesting-places, look like penguins; but the guillemots fly, penguins do not. They live night and day at sea, but come to land in countless hosts to lay their eggs and rear their young.



The puffin has a great coloured beak, looking far too big for its body. It is called the sea-parrot.



The razor-bills always nest near the guillemots and puffins. They make their home in St. Lawrence Gulf.



The great northern diver, when seeking fish for food, can stay under water for eight minutes at a time. Though so alert at sea, the bird walks very badly.



Gannets, when flying, see fish in the sea, and plunge from a great height into the water to catch them. Their bodies have air-sacs to protect them from injury.

enough above the heads of men, and far enough from his haunts, the guillemot is satisfied. It deposits its egg on the bare rock high up on a precipice, and there seems no reason whatever why the egg should not roll away and smash.

But there is a very good reason. The egg is long, very broad at one end, and pointed and narrow at the other end. When the egg is disturbed, it does not roll away as a round egg would. It simply rolls round in a little circle. If it were not for this safeguard the guillemots would soon become extinct. Every movement of the bird would be sufficient to send an ordinary-shaped egg to destruction, and there would be no young guillemots.

BIRDS THAT LIVE AT SEA AND COME TO LAND ONLY FOR NESTING

Where we see guillemots we may look for razor-bills. They are related, of course, but in appearance they are different. The razor-bill's beak is not so straight and slender as that of the guillemot, and it has not the cross grooves which that of the razor-bill has. There are guillemots in which the colour of the head and back and wings is of smoky brown. Others are black instead of brown. The habits of all are the same. They practically live on the sea, coming to land only for the nesting season, or when they are driven from the sea by the violence of the gales.

They eat fish, particularly young herrings and pilchards, and have so good a life that they are to be seen in countless swarms off our rocky coasts, and at the mouths of great rivers. Farther away there are smaller guillemots. The little auks breed only in the frozen North, and visit the Canadian coasts in the winter. There is a tufted Alaskan auk, which has feathers on its nose like a crest growing the wrong way about—forwards, instead of back over the head. Another little auk has a horn-like knob above the nostrils, possibly to act as a protection.

THE FUNNY LITTLE BIRDS WITH THE BIG BEAKS, AND THE HANDSOME DIVER

These descriptions sound comical, but the birds themselves are not nearly so funny-looking as the puffins, or sea-parrots. These have great horny, coloured bills, absurdly large for the

small size of the bird's body. It looks as if Nature had meant to make a great bird, but, after making the beak of one, altered her mind and made the little bird grow on to the end of the beak intended for the big bird. In spite of their funny looks the puffins have quite a good time. They fly, swim, and dive beautifully.

But the most famous of all the diving birds is that called loon, or great northern diver. This is a very handsome bird, measuring almost a yard in length. It is the perfection of grace in the water, and the finest diver in feathers. It can remain under water for eight minutes at a time, then pop down again as soon as it has taken a breath. It flies fast and straight when making for the Arctic regions to nest, yet its legs are so far back that it can hardly walk.

But the champion high diver is the solan goose, or gannet. This is a bird a little larger than the diver, and resembling a graceful goose, with a long and powerful bill. It breeds in swarms upon the sea-cliffs of Newfoundland, and on Bass Rock in the Firth of Forth, and is rather an enemy to the fishermen. It eats so many herrings that the fishermen say it drives the fish away.

THE AIR-CUSHIONS THAT PROTECT THE GANNET WHEN IT DIVES INTO THE SEA

But, at any rate, the gannets act as a signal to the men. The men watch the gannet flying high in the air. Suddenly they see it dash with amazing speed from aloft right down into the water. The gannet has air-sacs in its chest, which act as a pneumatic cushion, and prevent it from being hurt on making these great dives. There used to be still larger gannets with wings greater even than those of the albatross.

Very few of the sea-birds can be eaten, so fully charged with fishy oil is their flesh. Hence they are not often in the same danger of extinction as the poor penguins, thousands and thousands of which are yearly killed and boiled down for oil. If there were not savage members of the sea-bird family, the number of birds might become possibly too numerous. Nature, however, settles the problem herself. Here, as in every other branch of life, she sets her safeguards against too great an increase.

The next stories of Birds begin on 1737.

WHAT THIS STORY TELLS US

EVERY living thing must breathe, and now we come to study the lungs, the organs of breathing in ourselves and in all the higher animals. The real breathing or burning is done inside the living stuff called protoplasm, but the oxygen it needs is taken in by the lungs. These lie in the chest on a living floor of muscle which moves up and down as we breathe. The air enters the nose—or, when we breathe wrongly or in a hurry, by the mouth—and is there warmed, filtered, and moistened. Then it passes through the voice-box and into the tubes that lead right into the substance of the lungs. So it reaches the air-cells, as they are called, and there it comes near the blood which the heart has pumped to the lungs to meet it. We breathe by sucking in the air, and if we are wise we are careful never to wear any tight clothing over our breathing muscles, but we allow them free play in their ceaseless work of sucking into our lungs the air which our blood must carry to every part of the body for its life.

LIFE AND THE LUNGS

WE have already learned that everything must breathe, and that one of the reasons why the blood circulates in us and in all the other animals that have blood is to carry certain gases to and from the lungs. We have also learned that the real breathing is not in the lungs at all, but in the tissues of the body, where burning goes on. The proper name for breathing is respiration, and real breathing is called internal respiration. We may say a word or two more about it before we consider the lungs and how they should be used.

It has been found that there is a great difference between ordinary burning and the way in which protoplasm or living matter breathes. In ordinary burning, the oxygen just comes to the outside of the coal, or whatever it is that burns, and is then combined with it; but living protoplasm does not burn in this fashion. It takes the oxygen brought to it by the blood right into itself, and probably does many wonderful things with it, producing all the time the changes which are life, before at last it gives the oxygen out, combined with

CONTINUED FROM 1299



carbon to form carbonic acid gas, CO_2 , and combined with hydrogen to form water, H_2O . Thus we say that the breathing of protoplasm is inside its molecule, and since the word *intra* is Latin for *within*,

the proper way of stating this is to say that the breathing, or oxidation, of protoplasm is intra-molecular. It does not matter if you forget the word if you remember the fact. Now let us turn to the lungs.

We have seen that the heart lies in the middle of the chest, and has one lung on each side of it. We must now learn what makes the floor of the chest, for we shall find that this is a living floor, and that, indeed, the lungs cannot be used without its help. It is a flat sheet of muscle stretched right across the middle of the body. There are a few openings in it, through which pass veins and arteries and nerves, but otherwise it is a complete partition between the upper and lower halves of the trunk. It has a rather curious name, which, however, is used for many other purposes; it is *diaphragm*, pronounced *di-a-fram*, and meaning "across to fence." It is used for anything stretched across.



This picture shows us the exact position of the lungs and their exact size in relation to the rest of the body.

This diaphragm in our bodies has been described as flat, but really, as the picture on page 1637 shows, it is dome-shaped. It is a living floor, for it is a muscle. When it contracts it becomes more nearly flat, for it presses downwards. This, of course, means that everything beneath it is pressed upon, and as this muscle acts every time we breathe properly, you will notice in yourself that when you take a long breath the lower part of your body bulges forwards. That is because the floor of the chest, which is also the roof of the lower part of the body, has moved downwards and become flatter, so that the abdomen, as the lower part of the trunk is called, has to bulge forwards.

Upon this diaphragm, then, there rest the heart in the middle, and the two lungs. The part of each lung that rests upon it is called its base; it is the widest and broadest part of the lung. If we look at the base of each lung and then follow it upwards, we shall see that it becomes narrower and smaller, until at last it ends almost in a point which actually comes up near the neck behind the collar-bone. It is important to remember that the greatest bulk of the lung is its lower part, for there are two ways of breathing—one which fills the upper part of the lung with air and one which fills the lower part; and we see, of course, that it must be better to breathe in the way which fills the biggest and roomiest part of the lung. Now let us begin at the very beginning of the act of breathing, and see where the air goes.

THE CHANNEL THROUGH WHICH THE AIR ENTERS INTO OUR BODIES

There is a perfectly definite channel for the air from the outside world to the lungs, and if we are wise we always breathe by this channel. The opening of it is the nose. Now, this is very important, for it so happens that we, unlike some animals, can also breathe through our mouths, and though there is no objection to doing this sometimes, we should know that the mouth is the

opening of the canal that has to do with food, whilst the nose is the opening of the canal that has to do with air. Each opening is provided with suitable arrangements for its special purpose. The mouth contains teeth and all the arrangements for tasting; the nose contains little hairs for filtering the air; it contains all the arrangements for smelling, and, as we have seen, it has a wonderful loose lining which can be flooded with blood so as to warm the air before it enters our lungs.

THE WAY IN WHICH THE AIR IS FILTERED AS IT COMES INTO OUR LUNGS

But this is not all. If we trace out the passage of the air through the nose, we find that, instead of being straight and open, it is extraordinarily twisted and roundabout. You would not think that this was an advantage, but it is a great advantage. For one thing, it compels the air to pass over a great surface which has warm blood underneath it, so that the air is warmed, and it means, also, that a good deal of water vapour—that is to say, water in the form of gas—can be added to the air if it does not already contain enough. That is good, for perfectly dry air is very irritating to our lungs, and dries them up in a very unhealthy way. Lastly, this long, twisted, in-and-out passage for the air makes a splendid filter. A very large quantity of all the dirt in the air, and of any microbes that may be in it, is stopped by this filter, so that the air which is allowed to pass on to the lungs is not only nicely warmed and moistened, but is greatly purified. Experiments have been made which show that when, by means of a tube passed into the mouth, we withdraw the air which has been through the nose filter and is on its way to the lungs, no microbes can be found in it—though it may have had hosts of microbes in it when it entered the nose.

It follows, then, that it is the duty of every one of us to breathe through the nose. Now, the passage of air is easier through the mouth than through the nose, just because the mouth does not trouble to filter it; hence, if you



These pictures show us what the glottis, or voice-box, looks like. The vocal cords, shown in white, tighten to close the box more, and loosen to open the box more. When the box is almost closed the pitch of our voice is high; when it is opened wider our voice is lower.

keep your mouth open, air is sure to enter through it when you breathe. The rule, then, must be to keep the mouth shut. It should be opened when we have something to swallow, and it should be opened when we have something to say. In this latter case air passes through the mouth, but it is passing not inwards but outwards.

A MOST IMPORTANT THING IN LIFE IS TO BREATHE THROUGH THE NOSE

There are few more important lessons for health than this lesson that we should breathe through the nose, and not through the mouth, as a rule. Every child should be taught this lesson, and the way to learn it is to learn to keep the mouth shut. It does not take long before this becomes a habit

which we soon cease to notice and need not think about again. All over America there are unfortunate children whom their school-teachers think stupid, who are not as tall and heavy as they should be for their age, who

suffer from frequent colds and sore throats, and so on, simply because they have something the matter with their noses, which can easily be put right, but which, if it is not put right, prevents them from breathing properly through their noses as everyone should, and so goes far to spoil their lives. I do not think there is anything in this book more important than this rule that we should breathe through the nose.

After passing through the nose filter, the air streams into the throat at the back of the mouth, and passes into the voice-box, the front of which you can feel in your neck. This voice-box has two folds of tissue stretched across it from each side, with a tiny chink between them. Every time we breathe in air, the brain sends an order through certain nerves to the muscles which

govern these little folds, or vocal cords, as they are called, and they swing widely apart, so as to leave a large space through which the air can pass without making any sound.

We all know what a choking fit is. What happens then is that something or other which has got into the voice-box has thrown this beautiful arrangement out of order, and the vocal cords, instead of separating to let us breathe, are thrown together so that the air can scarcely force its way between them. In doing this it sets them trembling or vibrating—just as it ought to do on its way out when we speak or sing—and so makes those horrible little noises which we all make at these times.

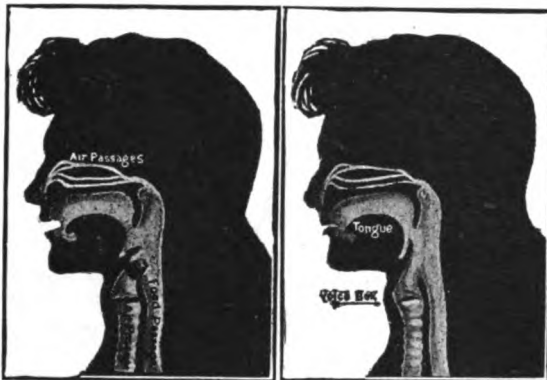
But though we feel very miserable

during a choking fit, we need not be afraid, for as soon as the brain finds it is getting too little oxygen in the blood brought to it, it *always* orders the vocal cords to relax, and in a moment we find that we can take a long, deep breath quite easily. Of course, this cannot save us in the rare cases where a lump of

food or something has got actually stuck in the top of the voice-box, so that the air cannot get past it. This is the only serious kind of choking. I have called it rare, and it is rare compared with ordinary choking fits, but it really happens often, and kills many people.

HOW WE MAY SAVE OURSELVES IN A CHOKING FIT

If we have all learned at school the simple things which really matter, and cannot be forgotten, no one need ever be killed in this way, so long as anyone else is present. Indeed, one could save oneself. The top of the voice-box is so near to the mouth, after all, that anyone can be saved by a forefinger quickly and boldly passed into the mouth so as to remove the



These diagrams show the positions of the passages through which air and food enter our bodies. The air enters through the nose, and is purified in the three white passages, then passing down to the glottis and on to the lungs. The left picture shows what happens when we choke. The epiglottis, the little trapdoor which drops and closes the windpipe when we swallow, has not been quick enough, and a piece of food has been caught

obstacle. This needs no skill, but only courage, and anyone who knows it may, in such a case, save the life that is dearest in the world to him or her.

Of course, little specks of food often find their way, as they should not, into the voice-box, but the result of that is to make us cough violently, which means sending up a great blast of air from the lungs, and that blows the obstacle away. It is very small babies and very old people who are most apt to be choked, for they cannot cough strongly. Also there is a terrible kind of sore throat called diphtheria, in which something is apt to form that blocks up the opening of the voice-box, and used to choke many children; but within the last twelve years there has been found a wonderful medicine which really cures this disease. When it is used in time it probably never fails.

It is a curious thing about the body, that, of the two passages in the throat, one for the air and one for the food, the food passage lies behind. This means, of course, that everything we swallow has to be made to jump across the opening into the lungs through the voice-box. We find this very easy, because the act of swallowing is such a wonderful one, little though most of us think about it. It depends upon the beautifully balanced use of scores of nerves and muscles. If we laugh or try to talk just when we are swallowing, of course we throw this beautiful machinery out of order, and instead of everything passing safely over the opening that leads to the lungs, some of it is apt to get in.

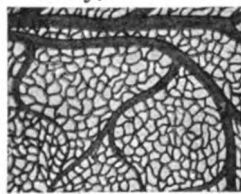
THE TWO TUBES THROUGH WHICH OUR BREATH GOES TO THE LUNGS

After passing through the voice-box, the air flows down the windpipe. This is a large round tube which you can readily feel for yourself in your own neck. Just below the big part of the voice-box there is a sort of ring, easily felt, which is really part of the voice-box itself, and below that you can feel the round tube running away down into the chest. If you feel carefully with the tip of your finger, you will find that this round tube is made of a number of little rings. This we usually

call the windpipe, and its special name does not matter. After it has passed down some distance, it divides into two tubes, one going to the right lung and the other to the left. Each of these in the substance of the lungs divides up again and again like a tree. These tubes are called the *bronchi*, a name which we can all remember, as when they fall ill we call the trouble bronchitis. As they subdivide, of course the branches get smaller and smaller, until at last they become quite tiny, and then we find that they end in a countless number of little buds, as we might call them, which are known as the air-cells.

HOW THE LUNG IS WONDERFULLY MADE WITH A SURFACE OF 2,000 FEET

These are not what we have learned to understand by the word cells, but little hollow spaces lined with living cells and containing air. Thus a little bit of tissue from the lung will float, unlike



This is what our lungs are made of—what we should see if they were cut through. The broad dark tubes are the veins and arteries, and the little ones are the capillaries.

any other tissue of the body, for from the first breath that a baby draws, the lungs become filled with air, which never wholly leaves it. The air-cells are lined with smooth, flat, living cells, through which the gases have to pass as we breathe. They are exceedingly thin, and immediately underneath them runs a rich supply of tubes containing the blood which is to be purified. This means, then, that the gases have to pass through two layers of cells—the layer that lines the “air-cell,” and the layer that forms the wall of the capillary or tube.

The structure of the lung is beautifully adapted for its purpose. Men have tried to measure the extent of surface where the blood is exposed to the air in the lungs, and they say that, in consequence of the way in which the lung is made, this surface would actually measure, if it were stretched out, 2,000 square feet. Of course, it is evident that if the lung were simply a big hollow space it would only have two or three square feet of surface, but as it is made rather like a sponge, the surface of it is increased to this enormous extent so that there is space enough for the blood to be purified.

If we could see the lung of a new-born baby, we should find it pearly white in colour, but tinted with pink by the

blood; if there were no blood in it, it would be perfectly white. The lung of an Esquimau, if he has never breathed coal-dust and smuts, is the same colour as that of a new-born baby; the lung of a coal-miner is quite black, owing to the large quantity of black coal-dust that he has been breathing. His nose cannot keep out everything, and all the particles it fails to keep back, which get into the lung, stay there, except that a few of them are picked up by the white blood-cells, and may be coughed up and so got rid of. The lung of an ordinary city-dweller is slaty grey—about half as dirty as the coal-miner's.

THE LIVING OARS OF THE LUNGS THAT DRIVE THE DUST BACK

It is one of the most important duties of the lung to keep itself free, as far as possible, from any foreign matter; the air-passages must be kept clear and open and without obstruction. There is a beautiful arrangement that helps this. If we look through the microscope at the cells which line the windpipe and the bronchi, almost down to where they end in the air-cells, we find that they are lined with cells of a particular kind. These have a number of tiny little things like living oars sticking out from them; they look rather like

eyelashes, and so are called after the Latin word for eyelashes, which is *cilia*.

All these living oars, or cilia, lash in the same direction, and that is upwards. They do their best, then, to push upwards as much as they can of the dust and dirt we breathe, and then, when we cough, we get rid of these. But the lung of the coal-miner and the lung of the city-dweller prove that, in spite of the nose filter, and the white cells, and the power to cough, and the cilia of the cells that line the windpipe and bronchi, it is still impossible for the lung to keep itself clean if, day after day, we breathe the

dirt with which the air of cities is filled. A great feature of the tissue of the lung is that it is elastic. This is due to the fact that it contains a great quantity of the special kind of tissue which we find in the body wherever elasticity is wanted. This tissue looks yellow under the microscope, and is made up of tiny threads which can be seen to curl up if they are loosened out. The lung is rich in this elastic tissue, and this is most important, since it has a great deal to do with the act of breathing. We are going to talk about that in a moment, but here I may say that the act of breathing out costs us in health no trouble or effort at all, since it very largely depends upon the elastic recoil of the stretched lung itself.

A grown-up man breathes about fifteen or sixteen times in a minute; a woman

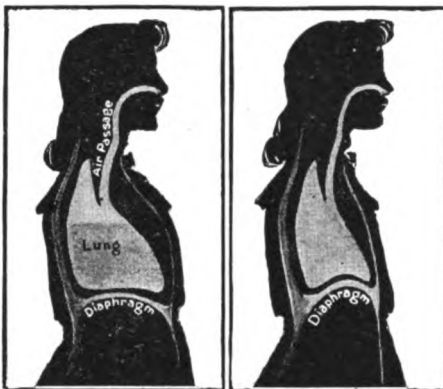
perhaps eighteen times in a minute. Children breathe much more often than this. Breathing has two parts—breathing in and breathing out. The first is called inspiration, and the second expiration, and now we must learn how these acts are performed.

The muscles of breathing are very numerous; indeed, in what is called forced breathing almost every muscle of the trunk is used, but in ordinary breath-

ing we use simply the diaphragm and the thin muscles between the ribs. Much the most important of these is the diaphragm, and it is important to give the diaphragm free play in breathing. If we wear tight clothes round the waist, the diaphragm is interfered with, and we can only breathe by using the ribs.

WHY IT IS HARMFUL TO WEAR OUR CLOTHES TOO TIGHT

Until lately this deceived the students of the body, who used to say that boys and girls and men breathe mainly by the diaphragm, but that women breathe mainly by the ribs. We know now that



Here we see what happens when we breathe in and out. When we breathe in, the diaphragm lowers, the ribs rise and move forward, thus making room for the lungs to expand as pure air rushes into them through the windpipe. This is shown in the left picture. When we breathe out, the diaphragm goes back to its arched shape again, and the ribs are lowered, while the poisonous gases from the blood are driven out.

that is quite untrue. Everyone who is properly dressed breathes mainly by the diaphragm. It is only because many women wear their clothes too tight that the movement of the diaphragm is interfered with, and so they have to breathe by their ribs.

When we breathe, then, an order is sent to the diaphragm from the brain, and it becomes flattened. This acts like what is called a suction pump. The amount of room in the chest is increased, and the air from the outside is sucked in.

THE TWO MUSCLES THAT MUST BE ALWAYS MOVING IF WE ARE TO LIVE

We have already seen that, at the same moment, the brain, which governs the whole process, sends an order down to the voice-box, so that a wide opening is made there between the vocal cords for the air to pass through. Inspiration, then, is a muscular act, requiring effort, and the muscles which perform it must go on acting if we are to live. A person may lie in bed all his life, and may never even move himself in bed. The muscles of his neck and arms and legs and trunk may all lie unemployed for years, but there are at least two muscles which must be in action if any of us is to live; they are the heart and the diaphragm.

Expiration, or breathing out, is quite different. Except when we cough or sneeze, or speak or sing, or when there is some obstruction in the air-passages, expiration costs no effort at all, and no muscles are employed. What happens is simply elastic recoil—the recoil of the stretched lung and the recoil of the wall of the abdomen, which, as you know, bulges forward when we breathe. So, without any effort, the air is forced out of the lung, and a new breath is taken in.

THE SMALL SPOT IN THE BRAIN WHICH IS THE CENTRE OF OUR LIFE

The whole of this wonderful process is entirely governed by a small spot in the brain, which we call the breathing centre. It lies quite near the centres that govern the heart and blood-vessels. The old name which was given to this centre when it first was found was the *vital point*, because in a sense it is the centre of our life. If anything destroys it, we must die. Certain poisons act upon it, such as the poison in opium; too large a dose of either opium or alcohol kills in this way by paralysing the breathing centre. We know now

how this wonderful centre works, and how it can modify our breathing. The nerve-cells that make it up are nourished by the blood, and they are very sensitive to the quality of the blood that reaches them. Especially are they sensitive to the presence of too much carbonic acid in the blood. Nothing else excites them so much. Directly this happens they send powerful orders to the breathing muscles to breathe deeply and quickly, and get rid of the excess of this poison.

Now, since these nerve-cells act entirely in accord with the quality of the blood, there is a way of getting them to rest for a time, and this is known by everyone who performs diving feats. Boys often try to see how many plates they can pick off the floor of a swimming bath. Now, the way to stay under water as long as possible is to take a number of quick, long, deep breaths for a little while just before you dive in. By this means you get rid of a great deal of the carbonic acid in your blood, and you can stay under water quite a long time, until at last so much fresh carbonic acid has passed into your blood from the tissues that your breathing centre will rest no longer, and you *must* breathe.

WHAT TO DO WHEN YOU COUGH THE WRONG WAY

We have already read something about sneezing, which is a particular kind of expiration, in the *CHILDS' BOOK OF WONDER*, on page 778. Speaking, singing, and coughing are all special kinds of expiration, too. Hiccough, on the other hand, is a special kind of inspiration. If you notice yourself next time you hiccough, you will see that it is just the opposite of coughing. In coughing you breathe out, in hiccoughing you breathe in. Hiccough is due to something disturbing the diaphragm; usually something in the stomach. If it can be stopped at all, there is one way of doing so which is much better than any other. What you should do is to breathe out as far as you can, and hold your breath there until you feel bound to breathe in again. Doing this three or four times will stop the hiccoughing, if it is to be stopped at all, for it means that you are deliberately ordering your diaphragm not to contract, but are making it rest, and usually it will behave after you do this.

The next part of this is on page 1787.

The Child's Book of FAMILIAR THINGS

THE WORLD'S FLAGS IN COLOUR

THE flags of all nations are shown in these pages in their proper colours, with their masts set in the capitals of the countries to which they belong, the boundaries of countries being marked by a red line. We can thus see at a glance the extent of the territory over which a particular flag flies. But it is important to remember that in painting and drawing these maps and flags, the artist has not been able to draw all the countries on the same scale—that is to say, Germany is shown about three times the size of Switzerland, whereas it is really about thirteen times as big. Any boy or girl, however, can find out the exact size of any of these countries from the little line at the bottom left-hand corner of each picture. This represents 100 miles in each case, so that if the country is drawn ten times as long as this line it is 1,000 miles in length. The flags shown are in nearly all cases the national flags, but in some cases the merchant or trading flag is used.

THE FLAGS OF ALL NATIONS

SOMEWHERE in his pockets a man carries a case containing cards bearing his name and address. If he wishes to be known, he presents one of his cards to the person whom he meets. That will make him known to anybody who can read. But years and years ago that card would not have served this purpose. Great lords and ladies could not read. They wanted signs, just as little children do to-day. When knights rode forth to battle, they wore cloaks over their armour, or carried pennons upon their lances, bearing their devices.

Nations are recognised by their flags just as the knights of old used to be. To carry a sign as a means of identification is a very old idea. The Israelites had their sacred standards; the Egyptians had their fan-like arrangement of feathers, borne on the top of spears, showing pictures of their gods and sacred animals. It was necessary that these signs should be borne, so that troops in battle would recognise the flag of their friends, and rally to it instead of fighting or running away.

When England first became a strong military power, her soldiers went forth to battle under many flags. Each great nobleman who kept a fighting force had his own standard, and there were as many battle-flags as noblemen in the armies, but in the time of Richard Cœur-de-Lion was the beginning of what is now the Royal Standard. It is known that he used the three lions for the national

flag, for there exists his great seal with the three lions, like those of the flag, upon it. As time went on and the British kings conquered other peoples, or married queens from other royal families, signs were added to the flag. For a long time England laid claim to France. Her rulers called themselves kings of France as well as of England, and the national flag bore upon it the badge of France until 1801. There were also the arms of Hanover in the middle of the Standard. There were many changes in it before it took the present form.

Now the Royal Standard is divided into four quarters, and represents the arms of Great Britain and Ireland. In the first quarter are the three British lions of England. In the second quarter the angry-looking fighting lion of Scotland. In the third quarter the harp of Ireland, and in the fourth quarter the lions of England are repeated. Wales does not appear as a separate country on the flags. She is so much a part of England. The arms of Ireland were on the flag long before the union of Ireland with England, because Ireland had been conquered by England, but it was not until 1801 that the union between the two countries took place. The arms of Scotland were placed on the Royal Standard when James VI. of Scotland became James I. of England. The Royal Standard is really the king's flag. It can be flown only where he is living and at a few fortresses.

CONTINUED FROM 1543

When the American colonies were subject to Great Britain they used the British flag. After they began to revolt a number of different flags were used in different colonies. One had a rattlesnake with the motto "Don't Tread on Me;" another much used had a pine tree.

Congress, in June, 1877, decided upon a flag of thirteen stripes, seven red and six white, with thirteen white stars upon a blue ground, to indicate that the Union was composed of thirteen states. Some think the idea came from the coat of arms of the Washington family, which shows white and red stripes and stars. Mrs. Betsy Ross, of Philadelphia, is said to have made the first flag, and the first time one was used in battle was at Oriskany or Fort Stanwix, August 6, the same year.

When Vermont and Kentucky, the first two new states, were admitted to the Union, both stars and stripes were increased to fifteen, but when other states were admitted, it was seen that the stripes could not be increased. So the number of stripes was reduced to thirteen, in honour of the thirteen colonies, but a star has been added for each new state. The number, when Arizona and New Mexico are finally admitted will be forty-eight.

The German nation consisted, until 1870, of many kingdoms and other little states. Then the countries united and made the King of Prussia the German Emperor. They had then to create a national flag. In this, as in the German Imperial Standard, the Prussian eagle and colours of black and white figure largely. That is because Prussia is the largest and most important kingdom in Germany, and the black eagle has for 500 years been the emblem of the Hohenzollerns, the royal family of Prussia.

The flag of Austria-Hungary looks curious with a patch of green in the bottom corner. The reason is this: The Austrians are one nation, the Hungarians are another. But one sovereign rules both countries. He is Emperor of Austria, but he has to be crowned a second time as King of Hungary. And to show that they are two countries, we have the colours of Austria and the patch of green for Hungary, declaring that the two flags of the two nations have been placed together and made into one to

represent the two peoples as one united nation. The Russian Imperial Standard is a two-headed eagle upon a yellow ground. This comes from the arms of the Greek Empire, the Tsar Ivan III. marrying, in 1472, a daughter of the ruler of the Greek Empire, and adopting her arms. Other Russian flags represent St. Andrew, who is said to have taken Christianity to Russia, and St. George.

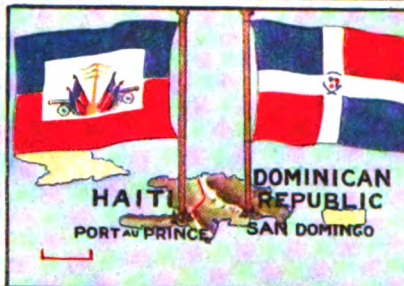
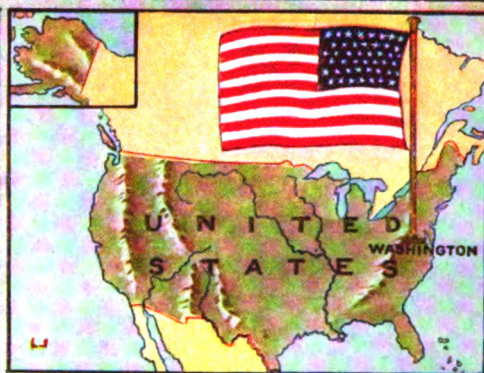
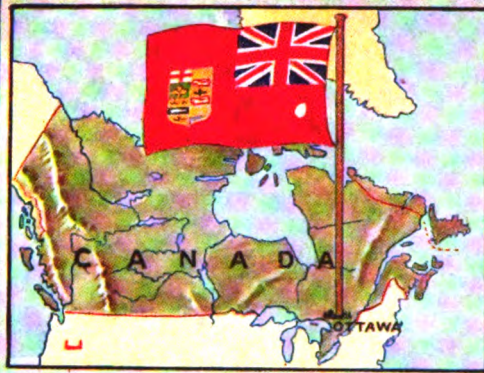
France, like England, has the red, white and blue for her banner. In olden times she had the fleur-de-llys. What that really was we do not know. Some say it was a lily; others say it was an iris; while others believe that it was the head of a lance. Anyhow, it was no longer used after the people of France turned their king off the throne and had Napoleon for their emperor. He had the eagle for his war emblem, but the simple red, white and blue banner is to-day, as it has been for nearly a century, the national banner of France.

The Spanish Royal Standard tells stories. It bears the arms of countries which it no longer owns. It shows the arms of Austria, of parts of France, of Sicily, of Portugal, and of parts of Belgium. All these places were once owned by Spain, and she retains the colours in her flag as if they still were hers. The flag which has been longest unchanged is that of Denmark. The Danish king, 700 years ago, thought he saw a cross in the sky when fighting against the heathen, and as he was victorious he adopted the cross for his banner.

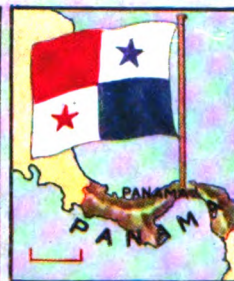
One of the youngest of important national flags is that of Italy. The might and majesty of Rome passed away, and the country became split up into miserable little states, partly ruled by the Pope, partly by petty kings who did great wrong. Victor Emmanuel, aided by Garibaldi and other bold volunteers, managed to rid the country of its enemies, and to make the Italians one nation. He was made king, and gave the country the flag of a united people.

Greece, which gave to mankind Alexander the Great, conqueror of the world, fell, in later days, under the rule of the Turks, who for 500 years held the country in bondage. In 1830 she gained her freedom. Her first independent king was from the royal house of Bavaria, and she adopted his colours.

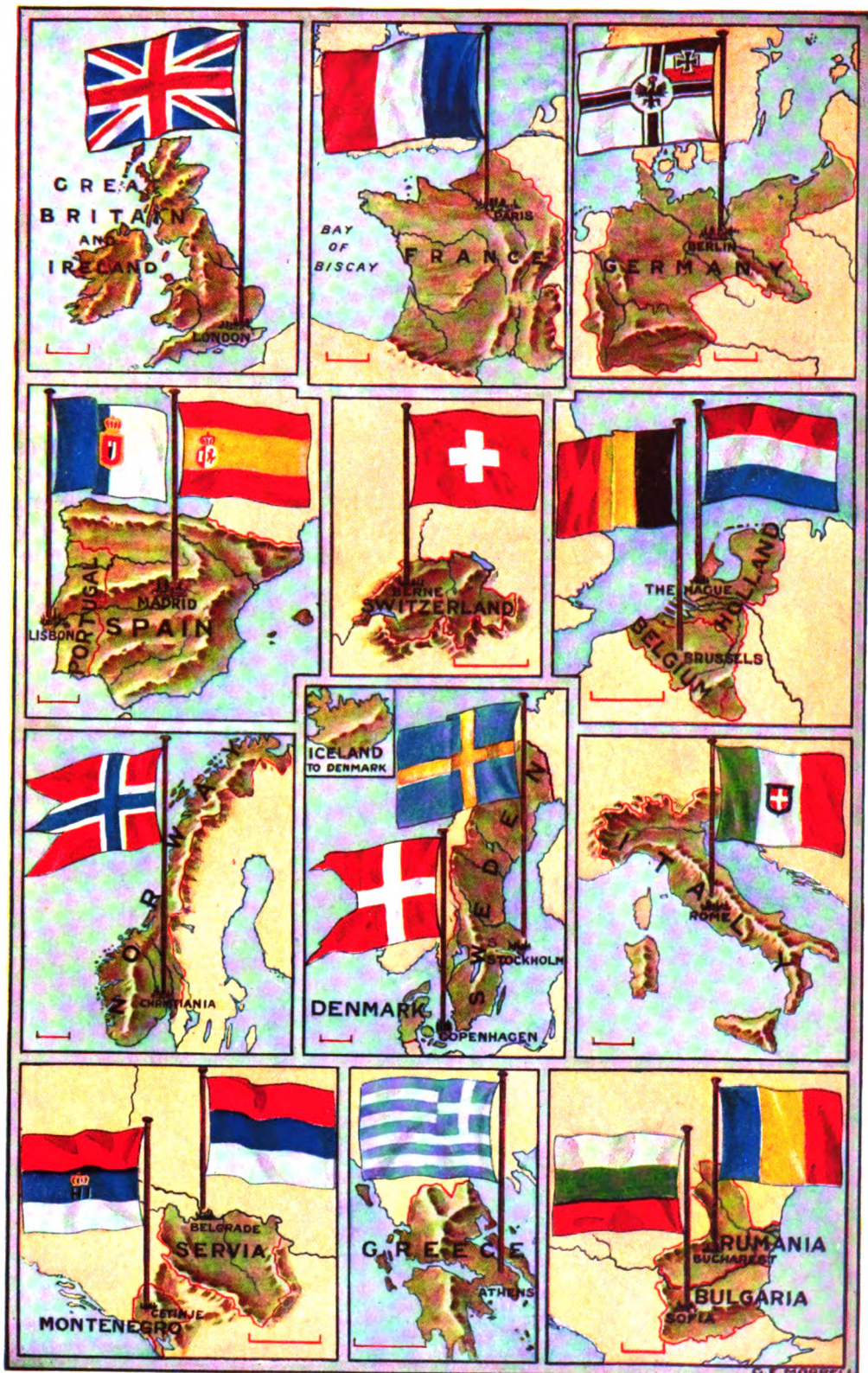
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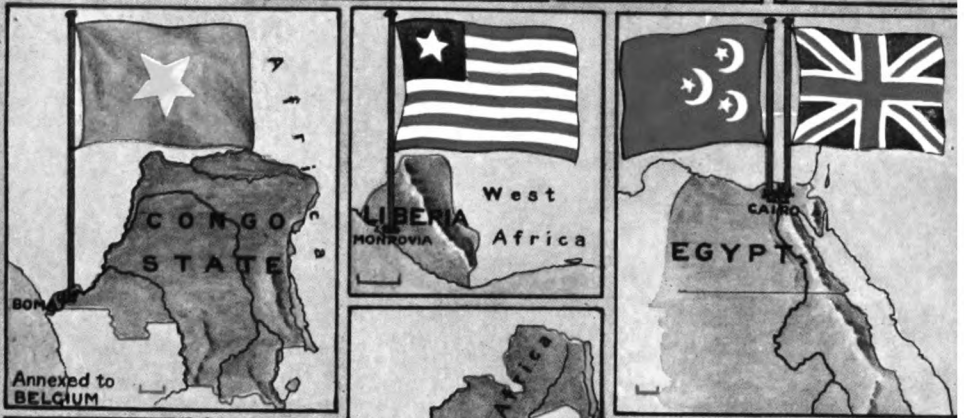
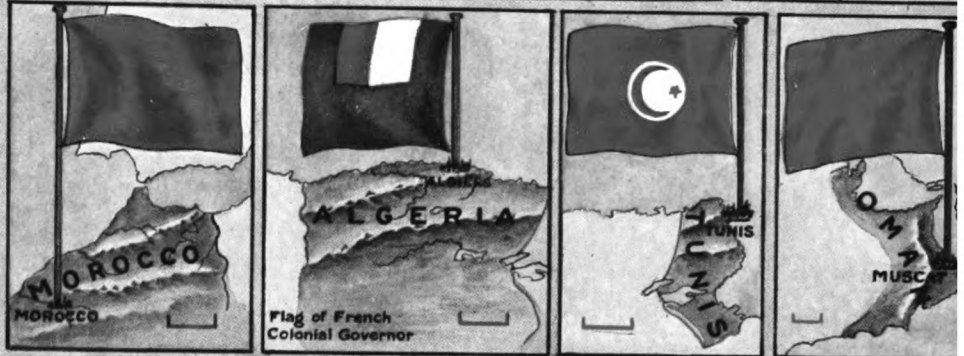
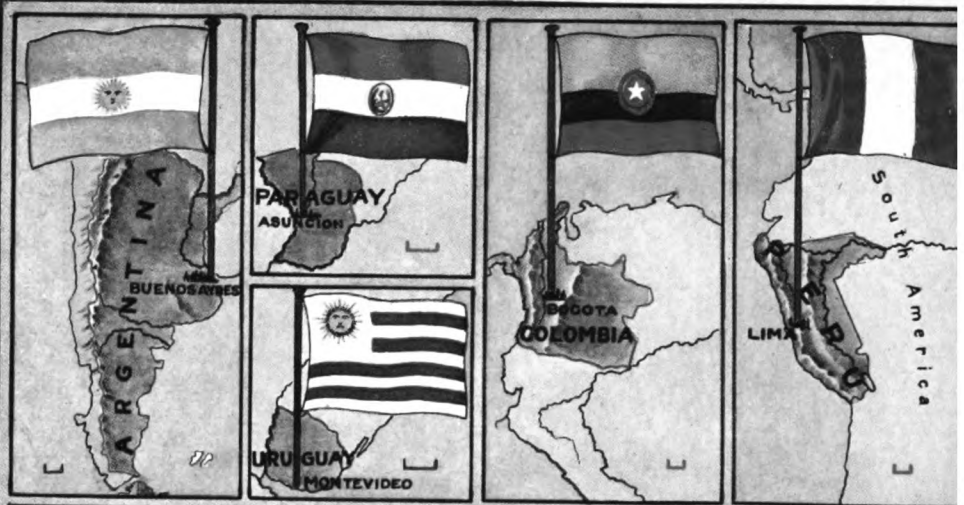


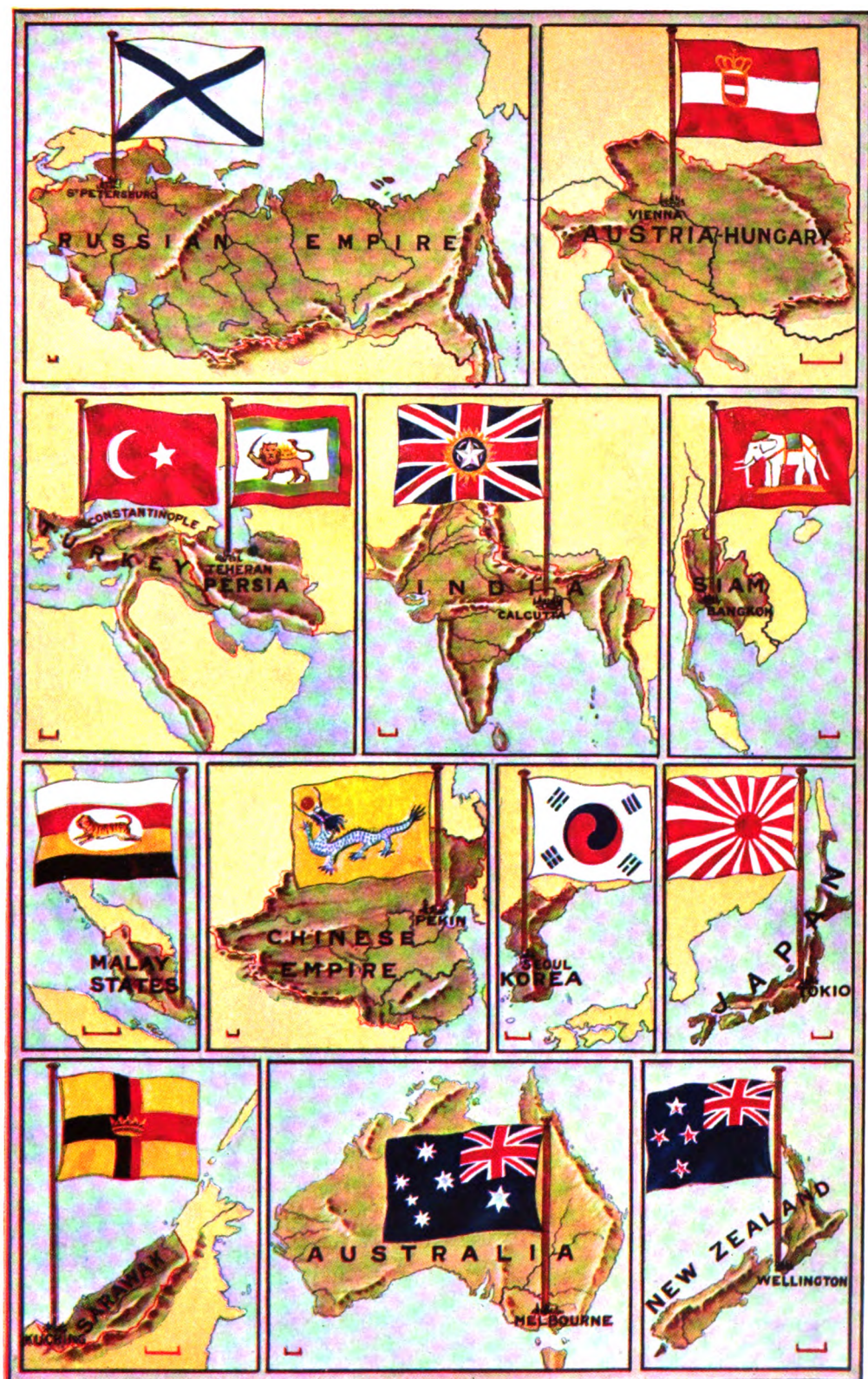
NICARAGUA
MANAGUA



BRAZIL
RIO DE JANEIRO







WHY DOES A SLATE PENCIL WRITE?

THE kind of pencil that we use to write on slate writes simply because the slate is hard enough to rub it down when it is pressed. Paper is not hard enough to do this; if we press very hard we only tear the paper. We not only require hardness, but also a certain degree of roughness, to enable us to write. Neither an ordinary pencil nor a slate pencil will write on glass, because the glass is so smooth that there is not friction enough to rub off the tip of the pencil as we move it.

WHY WILL A PEN AND INK WRITE ON PAPER BETTER THAN ON A SLATE?

The principle of writing with a pen and ink is quite different from that of writing with a pencil, because here we are using a fluid, and what we want is a surface which will readily absorb a small quantity of the fluid as we write, but not too much of it; and writing-paper does this very well, though blotting-paper is too highly absorbent, and so does not allow us to write clearly. But a slate and a surface of glass are not absorbent at all, and, as a rule, the ink runs very slowly from the pen because there is nothing to draw it, and it is held by the pen almost as well as if we were just hanging the pen in the air. But paper, being absorbent, is full of tiny pores, and these draw the ink out of the pen in just the same way as a sponge will suck water.

WHY IS THE AIR ALWAYS SO HOT BEFORE THUNDER?

As a matter of fact, the air is not always hot before thunder, but it almost always has a way of *feeling* hot, and the whole point lies in the difference between these two things. We judge of the warmth of what is around us by the warmth of our skin,

CONTINUED FROM 1578

in which lie the sensitive ends of the nerves that tell us of heat and cold. And the reason why we always think it so hot before thunder is that our skins are so very apt to get hot at such times.

Before a thunderstorm the air is almost loaded with moisture. Now, this means, naturally enough, that it is very slow to take up any more moisture, and our skins, which are always producing water—for we perspire all the time, whether we notice it or not—find that they cannot get rid of it to the air as quickly as usual, and we say: "How muggy and close it is!"

Now, one of the great means by which the skin and the body are kept cool, though we are always producing so much heat in ourselves, is by the evaporation into the air of the water from our skins. If this process is slowed, the skin gets uncomfortably hot.

After the storm, when the water has mostly fallen out of the air, the atmosphere can readily hold what the skin desires to part with, and then we say: "How delightfully fresh it is!"

HOW CAN WE JUDGE DISTANCE?

Mainly we judge by experience. For instance, a square box, as seen by us, is made up of lines running at various angles. This is true when we look at it, and a picture of it simply copies the direction of these lines. If we did not know that that was what a square box looked like, we could not tell its shape. A small child, who has no experience, is quite unable to tell.

A very young child, just beginning to observe, cannot tell distance, either in a picture or in a real thing, because it has not yet learnt that lines running in certain directions mean this or that

shape for the thing we are looking at. People who have been blind all their lives are similarly puzzled if their sight returns to them. It was long ago pointed out by observers of the mind that after the very beginning of our lives we never get a pure sensation of vision, whatever we look at, because we are always influenced by memory and experience, and so the eye contributes something of its own to what we see. Whenever we see distance in a picture or a real scene, the eye has made its contribution in this way.

HOW IS IT THAT WE SEE DISTANCE IN A PICTURE?

A picture or a photograph gives us the effect of depth and distance, and what is called perspective, in exactly the same way as our eyes do in ordinary seeing. When we see anything, a photograph—that is, a light picture—is printed on the retina of the eye. It is printed on the flat, just as if it were on a photographic plate, yet we interpret this flat picture to mean something that has depth and distance.

If it is a picture we are looking at, *its* photograph on the retina is no flatter than it would be if we were looking at the real thing. Thus, in every case, the brain has to make sense, so to speak, of a flat photograph printed on the retina.

In some measure it does so by help of the fact that we have two eyes, seeing at slightly different angles. Thus one eye sees farther round one side of anything than the other does, and the other eye sees farther round the other side, and so we are helped to get the idea of depth.

When we look at an ordinary picture, however, we do not have this advantage, and yet we get the effect of distance, just as we do when we look at a landscape with one eye only. So, plainly, having two eyes is not the whole explanation, or even most of it.

WHY CAN WE SEE SO MUCH OUT OF ONE SMALL WINDOW?

If we look at anyone's eye, we see in the middle of the coloured part of it a small black spot, called the pupil. Now, there is no denying that this spot is a window, and a very tiny one indeed; yet through it a man can gaze upon a great part of the face of the boundless sky.

Therefore this question about looking

out of a small window might have been meant to refer to the pupil of the eye as well as to the window of a house.

Let us take the case of looking at the sky at night through a window; in any case it must be through the tiny window of the eye. In many directions we see the stars, and the distance between them is enormous. This can only mean that the rays of light travel straight from each star to the eye, and enter it from various directions at once.

So long as the rays do not come in too slantingly to strike the retina—the curtain at the back of the eye—we shall see the stars at once. Of course, the size of the pupil, or the window, makes a difference, for if it is small, many rays coming at a big angle will be cut off.

WHY CANNOT WE WALK STRAIGHT WHEN WE SHUT OUR EYES?

It is really not very surprising that we cannot walk straight when we shut our eyes; it would be more surprising if we could. There is only one way in which we could possibly walk straight with our eyes shut, and that would be if the strides taken by our two legs were always equal. In that case we could walk straight with our eyes shut.

But, though we may not think it, our strides are not the same length, and this is probably true of everyone, without exception. Our legs are, as a rule, very nearly the same length, but if we measure them very carefully, we shall find that they are never quite exactly the same length. So, in point of fact, everyone takes rather a longer stride with one leg than with the other, and so, if we are left to ourselves, without any guidance at all, we walk in more or less large circles.

But when we find we cannot walk straight, even for a few paces, with our eyes shut, the reason is not in our stride at all, but in the difficulty of balancing. Our eyes are of the greatest importance in helping us to balance our bodies, and without them the weight of our bodies is apt to go too far on one side or the other, and then we have to take a step accordingly to save ourselves from falling, and so we thus lose the straightness of our course.

WHEN WE ARE LOOKING AT A RAINBOW, CAN OTHER PEOPLE SEE THE OTHER SIDE?

This is a very natural question to ask, and, of course, the whole answer to it depends on what a rainbow really

is. If it is anything at all like what it appears to be, there is no reason why, when we are looking at one side of it, other people should not be looking at the other side—just as if it were, say, the arch of a railway bridge. But it is absolutely impossible that anyone can be seeing the other side of the rainbow that we see.

What we call the rainbow is made by the reflection of sunlight from drops of water in the sky. Therefore, to begin with, the rainbow can only appear to us on the opposite side of us to the sun. Anyone trying to look at the other side of the rainbow would be looking towards the sun, where, owing to the very nature of a rainbow, one can never be seen. Now, if a rainbow is formed by the reflection of light from drops of water suspended in the sky, that are so placed as to have our eyes between them and the sun, plainly there can be no other side to the rainbow.

WHY DO OUR VOICES SOUND HOLLOW IN AN EMPTY HALL?

We can almost guess the right answer to this question for ourselves if we begin by asking ourselves why we use the word "hollow" to express the sound of our voices in such a case as this. The truth is that this is the kind of sound that is produced within any hollow or more or less rounded space, and, by a rather absurd use of language, we call the kind of sound produced in a hollow space a hollow sound.

Now, we must ask what it is that gives this character to the sound. It is that the sound is reflected back from the sides of the space where it finds itself, and it is this echoed quality that distinguishes it.

Exactly the same thing makes the difference between our voices on the level in the open air and in an empty room or hall. The reason why furniture and people and hangings help so much to deaden the sound in a room is that these things either have very irregular surfaces, which break up the sound waves and do not reflect them truly, or else they are made of materials which are soft and not elastic, and therefore simply absorb the sound and deaden it.

WHY DOES MY VOICE SEEM LOUDER WHEN I PUT MY HANDS OVER MY EARS?

We can help ourselves to answer this question if we consider the case of a sea-shell held over the ear. There is no

sound made in the shell, but it picks up all the tiny sounds that are made in the room, and echoes them to the ear. Our hands held over our ears act in exactly the same way. They echo the sounds just as the shell does.

But it is true that the special case where the voice is our own is rather different from other cases. Perhaps we are rather apt to think of sound as something that always flies "forward" from the place where it is made. But, just like the light of a candle, sound flies out equally in all directions, except in so far as special causes direct the waves or echo them.

So the sound made by our voices travels round beside our ears, and is caught and echoed into them by our hands. Not only do our voices sound louder, but they also sound very strange to us. This is because we usually hear our voices partly through the air waves coming against our ears, and partly by sound waves travelling through the head to the ears from the voice-box. Anything that alters the proportion of these two seems to change the voice.

WHY DO OUR HANDS BECOME WARM AFTER PLAYING WITH SNOW?

It is very wonderful that our hands should become warm after playing with snow, for it must be perfectly certain that the cold snow takes heat away very quickly from our warm hands.

The warmth of our hands is derived entirely from the blood, except at times when something hot is actually shining upon them. Therefore, for some reason or other, a very much larger amount of blood than usual must be flowing through our hands. The blood is no warmer in itself, or the whole of the body would at once notice it, but what really happens is that the hands are getting a richer and quicker supply of it.

The effect is just the same, really, as the delightful glow that we feel after a sea-bath. The brain has the duty of taking care of the skin, as of every other part of the body. Now, when the skin has been chilled, its life has been heavily taxed, and it will suffer unless it is compensated. So the brain orders the small blood-vessels in the skin, wherever it has been chilled, to relax and widen so that the warm blood is able to circulate quickly through them.

ARE THERE MORE PEOPLE COMING INTO THE WORLD THAN GOING OUT OF IT?

Certainly there are. There were never so many human beings in the world as there are to-day, and there will be more to-morrow. Every new power that men learn how to use, every machine and invention, all new knowledge about plants and animals, and the forces of Nature, mean, in the long run, that we are making the earth a place capable of supporting more of us. No one knows how rapidly the population increases in China and many other parts of Asia; but in Europe the facts are fairly well known.

Every year there are nearly half a million more people in the British Isles than the year before. The Germans add two babies to their population for England's one. This reckoning is not made on the birth-rate, but on the difference between the birth-rate and death-rate, which is what this question asks about.

In France the birth-rate and death-rate, though varying to and fro in the last year or two, are about equal; but in Russia, where families are the largest in Europe, the number of people increases every year to the extent of about two and a quarter millions.

In the United States the population increases very rapidly, for here it is increased not only by the fact that more babies are born than people die every year, but also because many people come there every year from Europe and, also, to an increasing extent, from Asia.

WILL THE WORLD'S FOOD SUPPLY EVER RUN SHORT?

It is quite plain and certain that, as people cannot live without enough food, there never will be more people than there is food for. But it is true, in a sense, that there is not enough food for all the babies that are born. The struggle for life is, in the first place, a struggle for food, and for a large number of people all over the world the struggle is so severe that many babies and children are killed by it, directly or indirectly.

But, as we read in the previous answer, the number of people in the world steadily increases, and doubtless always has increased since mankind came to be, except for short periods during some terrible war or pestilence. And steadily the amount of food has been increased

by human effort. Men learnt how to tame and care for sheep and oxen and goats, and so obtained flesh and milk. This pastoral stage—pastoral comes from the word pastor, which means a shepherd—yielded to the agricultural stage of growing crops, which supports far more human life than the pastoral stage alone can.

It is certain that some day there must be a limit, though, even with sixteen hundred millions of people on the earth, we are nowhere near it yet. When freed from the insects that carry disease, Africa alone will be capable of holding and feeding five hundred million people more than it does now.

WHAT IS MIST MADE OF?

Mist is made of water, as anyone can tell who has been out in it and has felt it cling to his hair and his clothes. But there are many and various ways, besides mist, in which water is found in the air, and one of the very questions which men of science are now doing their best to answer is the question why the water in the air should sometimes form cloud, sometimes mist, sometimes rain, and sometimes be found entirely as water-vapour, quite invisible and simply forming one of the gases of the air.

We are now beginning to learn that, if water is to be in the air in any form except the last, it must have something to cling round. This is true of rain-drops or mist or cloud. Probably the differences in these cases are due to variations in the kind of thing that the water clings to and condenses round.

Often these *nuclei*, as they are called, are particles of dust, large or small, but sometimes it seems that the very molecules of the other gases of the air are apt to get broken up by electrical power, and the broken parts of these molecules act as centres for the water-vapour to cling to and gather round.

HOW CAN THE EARTH REFLECT LIGHT WHEN ITS SURFACE IS DULL?

But is the surface of the earth dull? Surely not. The very fact that we can see it at all shows that it is reflecting light to our eyes, and very often the surface of the earth looks exceedingly bright; so also very often does the surface of the sea, and we all know how beautifully bright the lighted side of the clouds may appear.

The next Questions begin on page 1771.

THE WAVERLEY NOVELS

IN these pages we read two more of Scott's famous stories: "Ivanhoe" and "The Antiquary." The first is a romance of the return of Richard Cœur de Lion, or Richard "the Lion-hearted." In "Ivanhoe" we are, for the first time in the Waverley Novels, entirely in England. "The Antiquary" is a story of life not far from Edinburgh, on the southern shores of the Firth of Forth, in the last ten years of the eighteenth century. In the character of the sturdy old Whig antiquary, Jonathan Oldbuck, is reflected some of the author's own characteristics; and we are told that the novel was his favourite. The figure of old Edie Ochiltree, the garrulous, kind-hearted, wandering beggar, or "gaberlunzie man," has always been a favourite with Scott's readers. A beggar in those days wore a sort of uniform and had a licence to beg. An antiquary, of course, means one who devotes himself to the study of records and relics of the past.

WHEN KNIGHTS WERE BOLD

Being the Stirring Tale of "Ivanhoe"

THE period of the story, to quote Scott's own words, is that when Richard's return "had become an event rather wished than hoped for by his despairing subjects, who were in the meantime subjected to every species of subordinate oppression. The nobles, whose power had become exorbitant during the reign of Stephen, and whom the prudence of Henry II. had scarce reduced in some degree of subjection to the Crown, had now resumed their ancient licence in its utmost extent."

The scene of the story is "in that pleasant district of merry England which is watered by the River Don," where "there extended in ancient times a large forest, covering the greater part of the beautiful hills and valleys which lie between Sheffield and the pleasant town of Doncaster."

The forest was that of Sherwood or Rotherwood, numerous remains of which are still to be seen, and many parts of which are named after Robin Hood.

In romantic Sherwood, in the days to which the novel refers, there dwelt a brave old Saxon named Cedric of Rotherwood. In his service were a jester named Wamba and a swineherd named Gurth. One evening, as the sun was setting upon one of the rich grassy glades of the forest, these two were surprised by a party of horsemen. The travellers included a



monk, Prior Aymer of Jorvaulx, and a Norman knight, Sir Brian de Bois-Guilbert, commander of the Order of the Knights Templars. They were on their way to Ashby-de-la-Zouch, where a tournament was about to take place. They sought the way to Rotherwood, the residence of Cedric. Wamba, not liking their appearance, gave them directions which would have taken them to Sheffield. But at the cross-ways they found a palmer, or pilgrim, lying on the ground asleep. To settle the point whether they should turn to the right or the left, as to which the monk and the knight were divided in opinion, they awoke the sleeper, who conducted them to Cedric's mansion.

Cedric was no lover of the Normans, but he put hospitality before his other feelings, and opened his doors to the new-comers. When supper had been served in the great hall, the steward, suddenly raising his wand, said aloud:

"Forbear! Place for the Lady Rowena!"

A door was opened behind the banqueting-table, and the ward of Cedric, followed by four female attendants, entered.

"Formed in the best proportions of her sex, Rowena was tall in stature. Her complexion was exquisitely fair; her clear blue eyes seemed to command as well as to beseech. Her

profuse hair, of a colour betwixt brown and flaxen, was braided with gems. She wore a garment of pale sea-green silk, over which was a loose, flowing robe of crimson wool. Round her neck hung a golden chain, and a veil of silk, interwoven with gold, was disposed about her head and shoulders."

A ROUND THE HOSPITABLE BOARD OF CEDRIC THE SAXON

Cedric was endeavouring to draw the Templar's undesirable attentions away from his ward, when some disturbance was caused by the arrival of an old Jew, who called himself Isaac of York, and who pleaded for shelter for the night, as a storm had arisen. To the anger of the Normans, Cedric gave orders that the Jew should be given a seat at the lower end of the table. Here it would have gone hard with him but for the courtesy of the Palmer, who had entered with the Norman party, but whose face had remained hidden behind his cowl.

Wine having flown pretty freely, Sir Brian began to boast of the prowess of the Norman knights in the Holy Land.

"Were there none in the English army," asked the Lady Rowena, "whose names are worthy to be mentioned with the Knights of the Temple and of St. John?"

"Forgive me, lady," replied Bois-Guilbert. "The English monarch did, indeed, bring to Palestine a host of gallant warriors, second only to those whose breasts have been the unceasing bulwark of that blessed land."

"Second to none," said the Palmer, who had stood near enough to hear, and had listened to this conversation with marked impatience. It is impossible to describe the bitter scowl of rage which rendered yet darker the swarthy countenance of the Templar, as the Palmer repeated his statement, mentioning the names of Richard and of five others, and adding that the name of the sixth, "of lesser renown and lower rank," dwelt not in his memory.

SIR BRIAN TELLS OF IVANHOE'S DEEDS AND CHALLENGES HIM TO COMBAT

"Sir Palmer," said Sir Brian de Bois-Guilbert scornfully, "this assumed forgetfulness comes too late to serve your purpose. I will myself tell the name of the knight before whose lance fortune and my horse's fault occasioned my falling—it was the Knight of Ivanhoe.

Nor was there one of the six that, for his years, had more renown in arms. Yet this will I say, and loudly, that were he in England, and durst repeat, in this week's tournament, the challenge of St. John-de-Acre, I, mounted and armed as I now am, would give him every advantage of weapons and abide the result."

"Your challenge would be soon answered," replied the Palmer, "were your antagonist near you. If Ivanhoe ever returns from Palestine, I will be his surety that he meet you." As he said this, the Palmer placed on the table a small ivory box containing a sacred relic. In reply, the Templar took from his neck a gold chain, exclaiming, "Let Prior Aymer hold my pledge and that of this nameless vagrant, in token that when the Knight of Ivanhoe comes within the four shores of Britain, he underlies the challenge of Brian de Bois-Guilbert, which, if he answer not, I will proclaim him as a coward on the walls of every Temple Court in Europe."

IVANHOE DEFEATS THE HAUGHTY TEMPLAR IN THE TOURNAMENT

The next morning, very early, the Palmer, who seemed to know exceedingly well the ways of Cedric's dwelling, made his way to the cell where the Jew slept, and bade him arise and escape, as the Templar had threatened to kidnap him. The Palmer offered himself to conduct Isaac to a place of safety. Whispering a word in the ear of Gurth, which greatly astonished that individual, the Palmer gained egress for himself and the Jew.

When the two had arrived at a spot beyond the domains of Bois-Guilbert's friends, Philip de Malvoisin and Reginald Front-de-Bœuf, the Jew astonished the Palmer by telling him that he had pierced his disguise—the Palmer was a knight—and induced him to accept a letter that would secure him the loan of horse and armour.

When the day arrived for the opening of the tournament at Ashby-de-la-Zouch, Sir Brian and his companions easily vanquished all those who entered the lists against them. Then, after a pause, a solitary trumpet announced the entry of another champion. It was none other than the knight who, disguised as a palmer, had caused the Templar so much annoyance in Cedric's banquetting hall. He entered the lists with his vizor down, and carrying a shield which

SCENES FROM THE TALE OF IVANHOE



In the time of Richard I., the Saxons had not quite forgiven the Normans for conquering them. But Cedric the Saxon was very hospitable, and even Norman knights were welcome to his table, at which the beautiful figure of his ward, the Lady Rowena, was always to be seen in the place of honour. Cedric is here leading Rowena into the banquetting-hall.



Cedric's son had been sent away because he had fallen in love with Rowena, whom Cedric meant to be the wife of another. One day a pilgrim came to Cedric's table, where some Norman knights were. A Jew also arrived, and as the Normans meant to harm him, at night the pilgrim whispered in the ear of one of Cedric's men, who helped the Jew to escape.



The pilgrim was Cedric's own son in disguise, and that was why the swineherd Gurth did what he asked. At the table the pilgrim had challenged a boasting Norman knight, Sir Brian, to meet in combat one named Ivanhoe. At the tournament the encounter took place, and the Norman was overthrown by Ivanhoe.



The Lady Rowena had to award the wreath of victory to the knight of Ivanhoe, who, when his helmet was removed, was discovered to be none other than Cedric's own son and her sweetheart. But the hero had many other adventures to face before he married the fair Rowena, as told in the romance of "Ivanhoe."

bore the legend "Disinherited." The Templar was overthrown, and this was the lot of his companions with the exception of one, whose horse, rearing at a critical moment, placed him at a disadvantage of which the Unknown Knight refused to avail himself, whereupon the Norman owned himself vanquished by courtesy.

On the second day, in a fight, the Unknown Knight was even more successful, though he would have fallen when engaged with Bois-Guilbert, had not a knight in black armour ridden up and felled Front-de-Bœuf, when the last-named was spurring to his friend's assistance. At the moment when the Unknown Knight, having removed his helmet, was receiving from the trembling hands of the Lady Rowena the chaplet of honour, he fainted. It was then found that he had been badly wounded. Cedric, rushing forward, then discovered, what his ward had discovered before him, that the knight was none other than his son, Wilfred, whom he had banished because of his love for the Lady Rowena.

THE MYSTERIOUS BLACK KNIGHT WHO CAME TO IVANHOE'S ASSISTANCE

Cedric dearly loved his son, but desired that his ward should marry another. The son of Cedric and Ivanhoe were one and the same. The Black Knight who had come so opportunely to Ivanhoe's aid in the lists was none other than Richard, the crusading King of England, whose younger brother, afterwards the bad King John, had tried to usurp his throne during Richard's absence in the East. Ivanhoe was carried from the field by friends, his father having conquered his first impulse to claim him.

While Cedric and his party were returning to Rotherwood they came upon Isaac and his daughter Rebecca. With these two was an ambulance containing an invalid, and they sought protection on their journey, as their men had taken flight and fled after hearing that a band of outlaws was lying in wait for the travellers in the forest. At Lady Rowena's intercession Cedric allowed the Jew to travel with him. Some time afterwards Cedric's party was attacked by a band of armed men, and taken prisoners, only Wamba escaping. The armed band was composed of the Templar and some of the followers of the usurper, John,

who had been at the tournament. Wamba sought out Robin Hood, and this doughty outlaw, with the Black Knight, whose identity was as yet unknown to Robin Hood, laid siege to the Castle of Torquilstone, the fortress of Front-de-Bœuf, whither the captives had been taken. They arrived just in time to save the Jew from horrible torture, the Lady Rowena from the evil-hearted De Bracy, one of John's adherents, and Rebecca from an evil fate at the hands of Bois-Guilbert.

ROBIN HOOD JOINS THE BLACK KNIGHT IN THE SIEGE OF THE CASTLE

During the siege Rebecca found her way to the turret, where the wounded Ivanhoe lay, and induced Ulrica, an old woman with whom he had been left in charge, to hand over the charge to her.

The noise within the castle, occasioned by the defensive preparations, had now increased into tenfold bustle and clamour. Ivanhoe, impatient of his wounds, was all eagerness to see how the battle went.

"If I could but drag myself," he said, "to yonder window, that I might see how this brave game is like to go—if I had but bow to shoot a shaft, or battle-axe to strike were it but a single blow for our deliverance! It is in vain! It is in vain! I am alike nerveless and weaponless!"

"Thou wilt but injure thyself by the attempt, noble knight," replied his attendant. "I myself will stand at the lattice, and describe to you as I can what passes without."

"You must not—you shall not!" exclaimed Ivanhoe. "Each lattice, each aperture, will be soon a mark for the archers; some random shaft——"

"It shall be welcome," murmured Rebecca, as with firm pace she ascended two or three steps, which led to the window of which they spoke.

THE BRAVERY AND FORTITUDE OF REBECCA THE BEAUTIFUL JEWESS

In spite of Ivanhoe's appeals, this brave maiden (who had come to love the knight) took an ancient shield for protection, and kept him acquainted with the tide of battle. When he heard of the Black Knight's prowess, Ivanhoe was at no loss to understand who it was that was so valorously coming to their

aid. By the assistance of Ulrica, who, as an act of vengeance against Front-de-Bœuf, had set fire to the castle, the besiegers were successful; and it was in the arms of the Black Knight that Ivanhoe was carried out of the burning building.

But Rebecca was found by the Templar, and carried off by him to withstand a trial for witchcraft. Her fearlessness at length conquered the base heart of Bois-Guilbert, who begged and was given her forgiveness. He even meditated flight, but was induced by a wily counsellor to maintain his position at the Castle of Templestowe, where it was arranged that Rebecca should be burnt, unless a champion should appear on her behalf against him. At the last moment a champion appeared. It was Willfred of Ivanhoe.

When the Templar saw him, he said: "I will not fight with thee at present. Get thy wounds healed, purvey thee a better horse"—Ivanhoe's horse was exhausted with many miles of travel—"and it may be I will hold it worth

my while to scourge out of thee this boyish spirit of bravado."

But Ivanhoe insisted, and his knight-hood supported his claim, though Rebecca pleaded that he should not "perish alone."

In the result Ivanhoe, weak as he was with illness, went down before the well-aimed lance and vigorous steed of the Templar. But Bois-Guilbert also went down, though hardly touched, in comparison, by Ivanhoe's lance. "He had died a victim to the violence of his own contending passions." His death was pronounced "the judgment of God."

Rebecca was pronounced free and guiltless. At this moment Richard, with a goodly company, galloped on the scene. He had himself meant to champion the Jewess. He dissolved the Temple Chapter which had tried Rebecca. Once more in power, the King, having reconciled father and son, attended the marriage of Ivanhoe and the Lady Rowena in York Minster. Rebecca and her father soon after left England for Grenada, there to dwell in peace.

THE LOST HEIR OF GLENALLAN Or the Strange Story of "The Antiquary"

ONE day in the eighteenth century two travellers between Edinburgh and Queensferry, delayed by the tardiness of the diligence or coach, lost the tide, and stopped for a snack at the Hawes Inn. One was a young man, of genteel appearance, named Lovel. He had been a soldier. The other was a good-looking man of about sixty, whose hale complexion and firm step announced that years had not impaired his strength or health. His name was Jonathan Oldbuck (or Oldinbuck), of Monkbarns, one of a family that had been established for several generations in the vicinity of the thriving seaport town of Fairport (supposed to be Arbroath).

Jonathan had no taste for commerce, and had experienced an equal distaste for the law when he succeeded to the estate. His instructor had said of him that "he never pays away a shilling without looking anxiously after the change, makes his sixpence go farther than another lad's half-crown, and will ponder over an old black-

letter copy of the Acts of Parliament for days, rather than go to the golf or the change-house; and yet he will not bestow one of these days on a little business of routine, that would put twenty shillings in his pocket—a strange mixture of frugality and industry, and negligent indolence. I don't know what to make of him."

Mr. Oldbuck's manner at once interested and oppressed his fellow-traveller. Mr. Lovel, indeed, thought the old gentleman assumed an air of superiority that went beyond what the difference of age warranted. Both had their destination at Fairport, and though it was agreed that Mr. Lovel should call upon Mr. Oldbuck, the younger man delayed his visit till his baggage arrived, and he could present himself in a dress such as he thought corresponded with the rank in society he felt himself entitled to hold. It was not long before Mr. Oldbuck introduced his visitor to his "den" or retreat, where were amassed in extraordinary confusion all his antiquarian treasures.

The laird was describing to his visitor the evidences of an old Roman encampment near his dwelling, when they were surprised by the sudden appearance of a man who, having heard what Mr. Oldbuck had said, gave a very different description of what the antiquary had called the central point, or "pretorium" of the "camp."

EDIE OCHILTREE OF THE BLUE-GOWN, OR THE LICENSED BEGGAR

The new-comer—by name Edie Ochiltree—had the exterior appearance of a mendicant. A slouched hat of huge dimensions; a long white beard which mingled with his grizzled hair; an aged but strongly marked and expressive countenance, hardened by climate and exposure to a right brick-dust complexion; a long blue gown, with a pewter badge on the right arm; two or three wallets or bags, slung across his shoulder, for holding the different kinds of meal, when he received his charity in kind from those who were but a degree richer than himself—all these marked at once a beggar by profession, and one of that privileged class of men who are called in Scotland the King's Bedesmen, or, vulgarly, Blue-Gowns.

Not only did this individual cause confusion to Mr. Oldbuck. He suggested to Mr. Lovel that he knew enough of his movements to cause the young man to be very liberal in the way of alms-giving. Mr. Oldbuck, it should be remarked, had arrived at the conclusion that his young friend was an actor. Mr. Oldbuck was considerably exercised in his mind by Mr. Lovel's reticence about his own affairs. And this feeling spread to the Sheriff of Fairport, who had heard a rumour that, because Lovel went on lonely walks, and made free use of his pencil, he was a French spy.

HOW THE HERO OF THE STORY WAS MISTAKEN FOR A FRENCH SPY

Fears of a French invasion were pretty general at this period, but apparently Mr. Lovel entirely removed the worthy magistrate's suspicions, though the sheriff kept the explanations, whatever they were, to himself.

There was a rivalry of a kind between Mr. Oldbuck and his neighbour, Sir Arthur Wardour, an impecunious

and somewhat foolish Tory, who had also acquired a taste for antiquities. His daughter Isabel, and a son, now absent on foreign and military service, formed Sir Arthur's whole surviving family. With Jonathan Oldbuck lived his sister, Griselda, and his niece, Mary MacIntyre. Invited to dinner at Monk-barns, Lovel made the acquaintance of these personages, except the baronet's son, soon after his arrival at Fairport. A heated discussion sent the guests home rather hurriedly, and the host was alarmed to learn that Sir Arthur and Miss Wardour had proceeded by way of the sands. This route had been taken by the baronet and his daughter when they found that Lovel was ahead of them on the turnpike road which led to Knockwinnock.

As Sir Arthur and Miss Wardour paced along, enjoying the pleasant footing afforded by the cool, moist, hard sand, Miss Wardour could not help observing that the last tide had risen considerably above the usual watermark. There was a sudden change in the weather. Then they saw the figure of Edie Ochiltree advancing through the haze to meet them. The mendicant told them their only chance of safety was to retrace their steps.

HOW LOVEL HELPED TO RESCUE HIS SWEETHEART AND HER FATHER

Despite all that Ochiltree could do, they were in despair, when Lovel was seen coming down the crags to the rocks on which they had found temporary foothold. By Lovel's help the baronet and his daughter were enabled to reach to a high rock. The rescue was finally effected by a party of fishermen got together by Oldbuck, who, when Sir Arthur and Miss Wardour were safely in their carriage, took Lovel home with him for the night.

The next day Oldbuck and Lovel went to call upon Sir Arthur and Miss Wardour at Knockwinnock Castle. Lovel and Miss Wardour had met before; indeed, Lovel entertained a tender regard for the baronet's daughter; and she, in her turn, was troubled at the thought that the circumstances of the previous evening had made her and her father so much the young man's debtors; also by the fact that Ochiltree had before this seen them both together. Miss Wardour bade Lovel

dismiss his unfortunate attachment from his mind, leave a country that afforded no scope for his talents, and resume the profession he seemed to have abandoned. His plea was that she should "have patience with him one little month, and if, in the course of that space, he could not show such reasons for continuing his residence at Fairport as even she should approve of, he would bid adieu to its vicinity, and, with the same breath, to all his hopes of happiness."

A GERMAN ADVENTURER TELLS STRANGE STORIES OF HIDDEN TREASURE

We learn next that Lovel was thought to be the son of a man of fortune, but there was some mystery about his birth, and that Miss Wardour, who had first met him at her aunt's house in Yorkshire, did not, when she saw him at Mr. Oldbuck's, choose to renew his acquaintance till she should know that her father approved of her holding any intercourse with him.

Another significant fact disclosed at this juncture in the story is that Sir Arthur Wardour was greatly in need of money, and was basing hopes of fortune upon certain discoveries of one Dousterswivel, a German adventurer who obtained money from him under the promise of finding hidden wealth by a divining rod. Dousterswivel had come to both the baronet and Mr. Oldbuck with strange tales of appearances of old shafts and vestiges of mining operations. Mr. Oldbuck was misled to a small extent by some idea that the Phœnicians had in former times wrought copper in the spot Dousterswivel pointed out, but Sir Arthur had risked ruin in the enterprise.

THE HERO IS WRONGLY SUSPECTED OF BEING AN ADVENTURER

Invited with Oldbuck to join a small party at the ruins of St. Ruth's Priory, and afterwards to dine and spend the evening at Knockwinnock Castle, Lovel met Captain Hector MacIntyre, the nephew of the antiquary, and at the outset a distinct coolness arose between these two, the new-comer paying marked attention to Miss Wardour. The captain, with some haughtiness, questioned his sister Mary about the antecedents of his uncle's new friend. He followed this up by directly questioning Lovel about the latter's regiment, and showed very

plainly his doubt as to Lovel's replies, stating that he had no recollection of his name, though he knew the regiment referred to and the names of the officers.

Dissatisfied with Lovel's replies to his questions, the Hotspur-like Captain MacIntyre suggests to him that his further visits to Monkbarrow "must be dropped as disagreeable to him." Lovel's reply to the captain's emissary was that he should certainly visit Mr. Oldbuck when it suited him. The rejoinder to this was a request from the captain that "unless Mr. Lovel wished to be announced as a very dubious character he would favour the captain with a meeting in the ruins of St. Ruth." Lovel agreed to the meeting—with pistols—and secured a companion in an honest sailor, Lieutenant Taffril, whom he persuaded that, situated as he was, he could not discuss the subject of his family with any propriety.

HOW LOVEL FOUGHT A DUEL WITH THE ANTIQUARY'S NEPHEW

The meeting took place, despite the presence of Ochiltree, who did his best to prevent it. MacIntyre fell, begged Lovel's forgiveness, and bade him seek safety in flight, and this appeal being seconded by the mendicant, Lovel unwillingly allowed Ochiltree to lead him away into the recesses of the wood. At midnight, in the ruins, Ochiltree and Lovel witnessed an attempt by Dousterswivel to delude Sir Arthur with a bogus discovery of buried treasure and an equally bogus display of magic. The mendicant succeeded in giving the German a terrible fright, and in arousing the suspicions of the baronet on the score of Dousterswivel's honesty. Lovel next made his way to the seashore, and then on board Lieutenant Taffril's brig.

Meanwhile, Captain MacIntyre was being nursed at his uncle's house, whither Sir Arthur came for the double purpose of raising another loan and of acquainting Mr. Oldbuck with Dousterswivel's "find" of gold and silver coins in the ruins of St. Ruth. Sir Arthur was accompanied by Dousterswivel, and Mr. Oldbuck stipulating that all should visit the ruins together and seek by digging what could be found, the party set forth with picks and shovels. They were met by Ochiltree, who promptly recognised the horn in which the coins had been

"discovered" as an old snuff-box that had once belonged to him. The workmen, on the mendicant's advice, dug in a certain place. A chest of silver treasure was disclosed. When Sir Arthur and Mr. Oldbuck had gone away, the German was induced by the mendicant to meet him again for the purpose of unearthing further treasure. The old mendicant, who was also an old soldier, led the treasure-finder a sad dance. Dousterswivel had another awful fright, on awaking from which his senses were further tried by witnessing the midnight funeral of the Countess of Glenallan.

With the advent of the name of Glenallan into the story, the reader becomes acquainted with a romance in the early life of Mr. Oldbuck, and with the secret of Mr. Lovel's birth. The old countess had been very jealous of her position, and fearing that her eldest son, Lord Geraldin, would marry a Miss Neville, who, for family reasons, had been treated as her husband's daughter, she suggested to the son that this relationship was

a true one. But before she had approached him with this story he had married Miss Neville secretly. The young wife had died tragically after giving birth to a son, and the remainder of the days of her husband had been spent in sorrow and remorse. As for the son, he had disappeared, and no trace of him had been found.

Mr. Oldbuck, who had been a suitor for Miss Neville's hand, had done all he could to shield her name from blame, and had become convinced that Lord

Geraldin was a villain. It was only after his mother's death that Lord Geraldin learned from old Elspeth, the countess's former servant, the truth of the deception that had been practised upon him. In the meantime twenty years had passed by. The new Earl of Glenallan sought and secured the interest and help of Mr. Oldbuck in discovering his child.

By this time the bailiff had come to Knockwinnock Castle. But his arrival was speedily followed by a message from Sir Arthur's son, who, by the aid of a friend, was able to enclose enough money to release his father from a very humiliating situation.

The friend was none other than Lovel, by whose directions the treasure unearthed at the ruins had been placed there, in order that Sir Arthur might be benefited without knowing at whose hands. To Sir Arthur's son Lovel was known as Major Neville, a distinguished officer in the King's service. It remains to be stated that Major Neville, who had been

educated at the expense of Lord Glenallan's brother, and left his heir, was in reality the son of the earl. The restoration of the son to the father was followed by the marriage of the former to Miss Wardour.

Thus the tale of true love, though it had not run smoothly, ended in happiness, to the great joy of old Edie Ochiltree, whose satisfaction was none the less that Dousterswivel was effectively unmasked.

The next stories of Famous Books begin on page 1757.



EDIE OCHILTREE THE BEGGAR

This picture of the strange character who plays so prominent a part in "Guy Mannering" shows how a licensed mendicant looked in Scotland less than two centuries ago. He wore a blue cloak and a large badge, and carried a bag, into which he put the meal that people gave him. Begging was then a regular trade.



SISTER DORA & THE TOILERS OF WALSALL

IN the little village of Hauxville, in Yorkshire, there was born in the year 1832 a little girl who was named Dora Pattison, but who, when she grew to womanhood, was lovingly called by the hard-fisted toilers in the iron-foundries of Walsall "Our Sister Dora," a name that suited her well.

She was a bright, bonnie, merry girl who much liked to get her own way, and growing restless in the little country village where her home was, longed to go with Florence Nightingale to nurse the wounded soldiers in the Crimea. She was not then trained for nursing, and her father would not consent to her going, so she stayed at home and taught the village children. But she soon found her life-work in nursing and caring for sick people. She seemed to bear a charmed life, to have strength more than human, and her courage, self-sacrifice, and devotion to all who needed her help made her life one long golden deed.

In 1864 Sister Dora joined the Sisterhood of the Good Samaritan at Coatham, in Yorkshire, and the experience she thus gained in nursing poor people and taking interest in their needs was very helpful to her in her future hospital work.

Where pain and misery were, there was Sister Dora to help and cheer. When a worker in a coal-mine met with an accident and the surgeon at her hospital wanted to cut off his right arm, it was Sister Dora who

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pleaded with him to let her try to save it. She did save it, too, and the grateful man used afterwards to walk eleven miles every Sunday to ring the hospital bell with that arm, and inquire about Sister Dora, when she was lying ill herself. It was Sister Dora who helped a poor little burnt child to die so happily, that with almost her last breath she said she would meet Sister Dora in heaven with a bunch of flowers!

When small-pox broke out in the town, Sister Dora spent her hours of rest in nursing in their own homes those who had none to care for them. For six months she battled with disease and death almost single-handed, herself putting sufferers into the ambulances, and taking them away to be nursed, struggling with delirious patients and mothering every sick child. And with all her ceaseless work and untiring energy, she was so strong, cheery, merry, and full of fun, that she made her patients want to get well; as one of them said, "She'd make you laugh if you were dying." No one could be gloomy or hopeless when looking on her face, for it was aglow with the beauty of a loving, unselfish spirit.

Far too soon Sister Dora had spent all her strength for others; yet true to her noble nature she worked to the end, keeping her own suffering hidden from those around, and passing from one bed to another with her soothing touch, her cheery word, and her loving smile.

THE QUEEN WHO GAVE UP HER BOY

NEAR the beginning of the sixteenth century there was born at Fontainebleau, in France, a little girl, Jeanne d'Albert, heiress to the kingdom of Navarre and niece to the French king, Francis I. She hardly knew her parents, but was brought up in the country by her governess, and until she was nine years of age did not realise that she was kept a prisoner by her uncle, King Francis, in a castle on the banks of the Loire. This the king did, that when she was quite a child he might compel her to marry a Protestant duke. Little Jeanne was very unwilling to marry the duke the king chose, and was glad when the Pope annulled the marriage, and she was free to wed as she chose.

During the peaceful years she spent at Pau, Jeanne studied and learned to love the religion of the Huguenots, the persecuted Protestants of France, and her husband proving a worthless character, she devoted herself to their cause. On the death of her old father, she became Queen of Navarre, and while dark clouds were gathering round the heads of the Huguenots, she helped and encouraged them all she could.

The homeless and persecuted were ever welcome at her court, which grew to be looked on as a haven of refuge by the sorely troubled Huguenots. When

their leader, the Prince of Condé, fell in the disastrous battle of Jarnac, in 1669, and hope seemed dead, the faithful Queen of Navarre came to their aid. She rode into the camp among the despondent soldiers, bringing with her two fine bright boys—her only son, Henry, aged about fifteen, and his cousin, the now fatherless Prince of Condé, a boy of twelve, whom she had adopted. In stirring words she rallied the little army to defend their religion, and to avenge the death of their beloved Condé. Presenting the two boys, she cried:

"Soldiers, I offer you everything I have—my kingdom, my treasures, my life, and, more precious than all, my children."

These words were received in breathless silence, and then, as Prince Henry galloped into their midst, the soldiers greeted him with cheers as their leader. In clear ringing tones, he swore never to desert them.

Dark days were before the Huguenots, and to them the sacrifice of the Queen of Navarre seemed vain in the light of after events; yet who shall say that it was so, when her noble deed revived the courage of the Huguenots at a time of defeat, and helped to keep alive the Protestant religion in France.

THE BOY WHO WOULD NOT FIGHT AGAINST FREEDOM

HERE is the story of a young Italian who well deserves to be called a hero, though no one even knows his name. In the middle of the last century, there was no kingdom of Italy as there is now. The southern part was the kingdom of Naples, where the king was a foreigner, and the government was very harsh. Most of the northern half was under the rule of the Austrian emperor; and the Italians hated, as much as we should do, to feel that they were held under a foreign yoke, and the peasants rose in arms to win their freedom. They succeeded after a long struggle; and the first king of United Italy was Victor Emmanuel.

Now, the Austrians sent troops into Italy to crush the rebels. But, besides the Austrian soldiers, they compelled many of the Italian peasants to join the regiments which were engaged in preventing the people of Italy from winning their liberty. The peasants could not

resist; they could only do their best, at great risk to themselves, to give what aid they could to the bands of insurgents. If they were dragged off into the Austrian ranks, they were obliged to fight against their own countrymen to save their own lives.

But there was a young lad among those who were thus forced to carry arms against the Italian patriots, and he resolved that it was better to face death than to help in an evil cause. He could not resist the Austrians, but even in self-defence he would not fight against the liberators. And so, when his first battle was over, he was found slain by a bullet, with a smile on his face, holding the musket in his dead fingers.

But the musket had never been loaded. He gave his life for Italy without even fighting to save it, and a great poetess has given him immortality.

The next Golden Deeds are on page 1733.

SHAKESPEARE

The Child's Book of MEN & WOMEN

MILTON



THE MEN WHO MAPPED THE SKIES

PEOPLE often make fun of "star-gazers," but they would be very badly off if it were not for the star-gazers. Our great Navy would be practically useless. Without the help of the astronomers we could not steer at night, or out to sea. Our trains would run greater risks than they now do when travelling at night. Our almanacs would soon be out of date and useless. All would be chance and risk, for we should have no time-keepers, no guides.

Astronomy is the science which tells us all that is known about the heavenly bodies, and astronomers are the men learned in the science. We depend upon that science and upon the men learned in it for the government of our everyday life. It is probably the oldest science of all. It is certainly one of the most wonderful, and has the strangest, most interesting history.

The first astronomers were the ancient shepherds who watched their flocks by night in the fields, and gazed up into the brilliant skies, wondering what all the bright stars meant. Ignorant as they were, they made guesses at the meaning of the stars. We do not know who began the study. We know that the Chaldeans and the Egyptians were

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among the first; but India and China claim to have begun the study of the skies three thousand years before the Wise Men of the East followed the bright star to where Jesus was born in Bethlehem.

No doubt the Chinese astronomers would have been glad if their sovereigns had not been so interested in astronomy. For the men who studied the skies had to prophesy the date when an eclipse of the sun would take place, so that the people might get ready with gongs, and drums, and make noises, to frighten away the monster who, they believed, appeared in the sky to swallow the sun. If the astronomers failed to prophesy correctly, they were killed.

This shows us that the Chinese understanding of astronomy was not very clear; nobody's was in those early days. The first man to make an intelligent study of it was Thales, one of the Seven Wise Men of Greece. He was born in the year 640 B.C. and died in 556, and he gave all his life to the examination of the problems of Nature. He was the first to see that the sun and moon and stars were something more than signals placed in the sky to mark the operations of demons

JULIUS CAESAR

HERBERT SPENCER

and gods, and he was the first to draw maps showing the position of the most noticeable stars in the heavens.

About 400 years passed away before another great thinker took up astronomy. This was Hipparchus, a Greek scholar, who was doing his work about 150 years before the birth of Christ.

HIPPARCHUS, THE GREATEST OF ALL THE ANCIENT ASTRONOMERS

Hipparchus made a close study of the heavens, and was able, in a rough-and-ready way, to predict what would happen in the skies. This was different from the prophesying of the magicians, of whom the Bible tells us. There was fraud and guess-work. Hipparchus prophesied because he had scientific knowledge. Moreover, he first brought astronomy to the assistance of geography, and made maps of the heavens, and of so much of the earth as was then known.

This does not seem much to us to-day, but it was really wonderful so long ago, when very little was known of science, and when there were no scientific instruments for measurements. Hipparchus found out that the year as counted by the sun was shorter than the year counted by the stars. This he learned by making measurements and comparing them with measurements taken 150 years earlier by Timocharis, another diligent student of the heavens. Hipparchus was the greatest of all the ancient astronomers, for his observations enabled him to write with skill about the sun and moon and the planets, and to fix the time of their movements with accuracy. Had another such man soon arisen, astronomy would before long have become a great science.

HOW PTOLEMY LED THE WORLD ASTRAY FOR THIRTEEN HUNDRED YEARS

But nearly 300 years went by before another famous star-gazer arose, and he did, perhaps, more harm than good. This was Ptolemy Claudius, an Egyptian mathematician, who lived in the second century after Christ. He carefully studied the works of Hipparchus, though nobody else seems to have preserved a copy. In addition to this study he did independent work. He discovered important changes in the course of the moon, and he discovered that light, coming from a distant star, on entering a thicker atmos-

phere, is refracted—that is, turned aside from the path which it was pursuing. So far so good.

The mischief that Ptolemy did was to declare that the earth exists as a fixed body in the midst of the universe, and that the heavens revolve round it once every twenty-four hours. For the next thirteen hundred years all the civilised world believed his theory to be true. People believed, during all that time, that the sky was a great solid vault, turning round on a mighty axis which fitted into fixed sockets, and that the stars were attached to the surface of the vault, by nails, or other wonderful fastenings.

Not the whole of this belief lasted up to the time of Copernicus, but the Ptolemaic system did. After the Greeks, the Arabs took up astronomy. They found the works of Ptolemy, seven hundred years after his death, and never questioned the theory. They worked on in the belief that all was as Ptolemy had said, and their own observations were added to the store of known facts; but they never came any nearer to the real truth than Ptolemy himself had done long before.

COPERNICUS, WHO SAT IN A TOWER AND WATCHED THE STARS

The modern history of astronomy dawned with Nicholas Copernicus, who was born in Poland in 1473, and died in 1543. He was one of the wonderful geniuses which poor homes often produce. It is believed that his parents were serfs or slaves. At any rate, they were as poor as they could be. Luckily, Copernicus had an uncle who was a bishop, and was able to befriend him. The boy was left fatherless when quite young, and this good uncle became a second father to him, and had him educated as a doctor and a priest.

Copernicus, as soon as he could, settled down as a canon at his uncle's cathedral, and devoted his days to relieving the sick and suffering, to preaching, and to the study of astronomy. He read all that he could of the old writers on astronomy, and his clear mind saw that there was something wrong in the conclusions which Ptolemy had reached. Night after night he would sit up in a tower and watch the silent stars, pondering on their mystery. He saw that the sun does not go round

the earth, but that the earth and the other planets go round the sun. But it was terrible to think such a thing in those days. The Church held that God had made our earth the centre of the universe, that ours was the greatest and most important planet in the universe, and that all the heavens obediently attended, meekly whirling round and round us. If it were believed that the earth was not the centre of the universe, then the Church said that the importance of the earth disappeared, except for the fact that it was the home of man. The Church did not see that the fact of man, God's highest creation, living upon the earth gave the earth a crowning glory such as, perhaps, no other planet possesses. They had agreed that the earth was the centre of the universe, and it was held that only the sinful would dare dream anything else.

Copernicus wrote a book to prove his new theory. In many ways it was faulty, but it contained great and wonderful truths, and was the foundation of modern astronomy. He knew the danger he ran, and he feared to give his book to the world. For years he kept it by him. He was drawing near to death when he at last ventured, and he received the first printed copy of his work on the very day that he died.

THE GREAT BOOK THAT COPERNICUS PRINTED ON THE DAY HE DIED

The book at first reached the hands of only a few educated people, so the Church did not much mind, and nothing was done concerning it for seventy years. Then the Church forbade people to read it.

Here we must say a word for the first Englishman interested in astronomy. This was Robert Recorde, who was born at Tenby, Pembrokeshire, in 1510, and died in 1558 in a London prison, where they sent poor men who owed money. He taught mathematics and medicine at Oxford, but settled down in London, where he had the opportunity to make much money; but he seems to have been careless, so that he became imprisoned for debt.

He was, as far as we know, the first man in England to agree with the new views put forward by Copernicus, and he was the first Englishman ever to write on astronomy in English.

Now we cross again to the Continent, to make the acquaintance of a famous Dane, named Tycho Brahe, who was born at Knudstorp, Sweden, when that town belonged to Denmark, in 1546, and died at Prague in 1601. Some boys have to struggle against poverty when learning, but Brahe had to struggle against riches. His parents were distinguished people, and they hated the thought of their son studying for the love of learning. Wishing him to be a lawyer, they sent him to university after university that he might study law.

TYCHO BRAHE, THE RICH YOUNG DANE, AND HIS CITY OF THE HEAVENS

But all the while his heart was in the heavens. He had only a pair of compasses in the way of scientific instruments, but with these he set himself, when fourteen years of age, to study the distance of the stars. In spite of hindrances, he became famous as an astronomer, and when he was thirty his work attracted the notice of the King of Denmark, who gave him a pension, and built him the finest observatory that the world had up to that time seen. This was on an island near Copenhagen, and was called by a name which meant the City of the Heavens.

Here for twenty years Brahe worked at the task he loved. Copernicus had been three years dead when Brahe was born, but Brahe studied the great man's works, and improved upon them. He did not believe that the ideas of Copernicus were quite right. It seemed impossible to him that the earth could be the tiny globe which Copernicus's theory made it appear. Great as was the mind of Brahe, it was not great enough to receive that truth. He favoured the belief of Ptolemy, that the sun went round the earth. The other planets, he said, undoubtedly go round the sun, but he believed that they and the sun go round the earth, which is fixed, and not to be moved out of its place.

THE SORROWS OF TYCHO BRAHE AND HOW GOOD CAME OF THEM

That was his great mistake. But his work was very valuable. He discovered new laws governing the motion of the moon; he helped forward knowledge with regard to comets, and he worked out, more accurately than anybody else had done since the days of

Hipparchus, the position of some of the most important stars.

Brahe had many sorrows to bear when his friend the king died. His pension was stopped, his splendid observatory was broken up, and he had to go to Prague, where the Emperor Rudolf became his friend. It was a good thing for the world, for there Brahe met a youth who was to become even a greater astronomer than himself.

BRAVE JOHN KEPLER AND HOW HE READ THE MYSTERY OF THE STARS

This was John Kepler, the great German astronomer, who was born in Würtemberg, in December, 1571, and died at Ratisbon in 1630. His parents were poor gentlefolk, who managed to give him a good education, but had no riches for him. He was educated at a monks' school, and when twenty-two was appointed to lecture on astronomy. Up to then he had had no special love for the science, but he had read the writings of Copernicus, and believed in them. From this time forth he gave his life to the study of the skies.

He was always poor, and often, in later life, had difficulty in getting money enough on which to live. But he was too brave a soul to care about want.

What he desired to know was: How were the great bright bodies in the solar system kept in their position? He made many daring attempts to find the right answer. Some were well on the way towards the discovery; others were wild and wide of the mark. He wrote a book on what he had thought and done, and this brought him to the notice of Brahe, who had him appointed assistant to himself. Brahe had only two years to live, but those years were precious in the history of astronomy.

THE GREAT THINGS THAT KEPLER DID, AND THE COMING OF GALILEO IN ITALY

He taught Kepler all he could, and at his death left him all his papers and instruments, and all the facts which he had worked out. Kepler was appointed to the place which Brahe had held, and never rested until he had worked out the answer to the great questions which he had set himself. He discovered the laws which enable us to tell the place of any planet in its orbit—that is, its circular path through the skies—at any time past or present. Kepler's Laws became

the foundation of the new astronomy studied on scientific lines.

All this time no man had ever seen the sky through a telescope. The great discoverers of the secrets of the heavens had had to do their work with unaided eyes. Galileo was the first man to turn a telescope towards the sky. He did much more than that, as we shall see. His name was Galileo Galilei. He was born at Pisa, Italy, in February, 1564, and died at Arcetri, near Florence, in 1642. His family had in the past been distinguished, but his mother and father were poor, and they were anxious that he should have a good education as a doctor. They did not want him to study mathematics, lest the knowledge should lead him away from the profession which they wished him to follow. He was a very clever boy, showing skill in mechanics, in modelling, and in music; and he painted with such art that, had he been born earlier, he would certainly have followed the calling of an artist. He wished to be one, and on entering Pisa University he saw that to be a good artist he must learn something of geometry. The study of this subject opened new fields of knowledge to him.

HOW GALILEO GAVE THE DOCTORS THE FIRST MACHINE THEY EVER HAD

He read of the experiments of Archimedes, and how that great man had found out the quantity of base metal in his king's crown. Galileo saw that there was a simpler way than that of Archimedes, and he invented a balance which would solve the problem more quickly. He wrote an essay on it, which so pleased a great man that Galileo was appointed to lecture on mathematics at Pisa, and to continue further studies in the way that he had begun. There was now no further talk of his being either a doctor or an artist. He was allowed to follow science all the days of his life.

But before all this he had done something for the doctors which nobody else had done. He noticed a great lamp swinging in the cathedral at Pisa, and saw that, no matter how long or how short its swings, its beats were regular. This set him thinking, and he invented the first pendulum, and used it to measure the human pulse, so that by its aid a doctor could tell how fast the

heart of a patient beat, and with what strength or weakness. That was the first mechanical contrivance ever made to help the doctors in their treatment of the human body.

While studying at Pisa, Galileo felt convinced that much of the teaching of the day was wrong. People still believed in Ptolemy's system of astronomy, but for other mechanical laws they accepted what had been written by Aristotle, a scholar who, born nearly 400 years before Christ, became the tutor of Alexander the Great. Aristotle was a wonderful man, but not all that he said was right. One of his

there is a picture on page 288. Now, according to Aristotle, the shot weighing ten pounds should have reached the ground in one-tenth of the time occupied by the shot weighing one pound. But they both reached the ground together. Galileo rejoiced at this proof, but the followers of Aristotle were furious. They would not believe what their eyes showed them. They could show by the books of Aristotle, they said, that such a thing could not be. But Galileo declared that, except for the light article being a little more resisted by the air than the heavy article, all bodies fall at the same rate. This

THE TRIAL OF GALILEO, WHO WAS TORTURED FOR TELLING MEN THE TRUTH



Galileo, the first man to make a telescope and look through it, was the first man to announce that the earth was a ball moving round the sun. The Church disbelieved him and brought him before the Inquisition. The Inquisitors tried to make him say that he was wrong in what he taught. After denying that the earth moved, we are told that he added under his breath, "And yet it *does* move."

beliefs was that, if two bodies of the same substance fall from the same height, the heavier body will reach the earth first; that a body twice as heavy as another body must reach the earth in half the time of the lighter body. For 1,900 years nobody had thought of questioning this. Galileo was the first to do so. He saw that it was wrong, and he said so.

He took two shots, one weighing ten pounds and the other weighing one pound. He let them fall from the top of the leaning tower of Pisa, of which

declaration made everybody very angry, and students and professors at the university became his enemies.

Soon there was another grievance against Galileo. A powerful man wished to dredge the mud out of Leghorn harbour. The model of his machine was shown to Galileo, who said that it would be impossible to do the work with it. What he said was proved to be true when the work was actually tried; but, in the meantime, his honesty made his enemies so angry that he had to flee from Pisa to Florence.

Here his lot was miserable. His father died; and Galileo now had his mother, a brother, and two sisters depending upon him. After two unhappy years he was made professor of mathematics at Padua. He was now 27 years old, and remained at Padua for eighteen busy years. He did an enormous amount of work for science, and people flocked from all parts of Europe to hear his lectures.

HOW GALILEO WITH HIS TELESCOPE FOUND THAT ARISTOTLE WAS WRONG

He was poorly paid, and had to act as tutor to pupils—many of whom became famous men—in order that he might have money enough for the wants of himself and his family. At the beginning of his career he had believed in Ptolemy's system and had taught it to his pupils; but, as he learned more, he saw that Copernicus was right; and, though he knew that to teach Copernicanism meant danger to himself, he did teach it.

In 1609 he improved the telescope. One had been made in Holland for use on land, but Galileo made a better one, for seeing the sky. We must not stay here over the making of the telescope, of which we read in another part of this book. The first thing that Galileo examined with his telescope was the moon. He saw that it was like our earth, full of mountains and hollows. The followers of Aristotle would not believe this. The moon was perfectly round and smooth, they said. But greater wonders were to follow.

Galileo discovered, by the aid of his glass, that the system of planets was not quite what had been thought. He found that there were lesser planets revolving round Jupiter, just as other planets revolve round the sun. This excited the enemies of Galileo more than ever. How could such things be, they cried. One of them said: "There are only seven openings in the head—two eyes, two ears, two nostrils, and one mouth; there are only seven metals, and seven days in the week, therefore there can be only seven planets."

HOW THE CHURCH GREW AFRAID AND TRIED TO STOP THE SPREAD OF TRUTH

Galileo made them look through the telescope, and there were the heavenly bodies to be seen. "Oh, well," they said, "they are not visible to the naked

eye, so they cannot exercise any influence on the earth; and, being useless, therefore they do not exist." The discovery brought Galileo new fame, and he was persuaded to go to Florence at a much larger salary. He discovered many other things in the sky, and showed that, although the earth goes round the sun, the sun itself turns round also.

Now, in 1600, a great man, named Giordano Bruno, who was born near Naples about 1548, was burnt to death for upholding the Copernican theory. Galileo was not frightened by that. He declared, as Bruno had declared, that Copernicus was right. He declared, too, that the stars and planets are made of the same substance as the earth; that the universe is not limited, but unlimited in extent.

The Church now became alarmed. It turned in 1611 to the works of Copernicus, and declared that they should not be read. The Inquisition, a court with terrible powers, conducted by officers of the Church, summoned Galileo before it, and made him swear to deny that the earth goes round the sun. If he did not agree, he was to be thrown into prison. He did agree, for the Inquisition could torture him to death if it chose.

HOW GALILEO WAS TORTURED AND WROTE BOOKS TILL HE WAS BLIND

Sixteen years passed away, and then Galileo continued his studies and wrote a book defending and proving the Copernican system. For this he was again called before the Inquisition. Dressed in sackcloth, he was made to kneel and swear that he would never again say or believe that the earth moves round the sun.

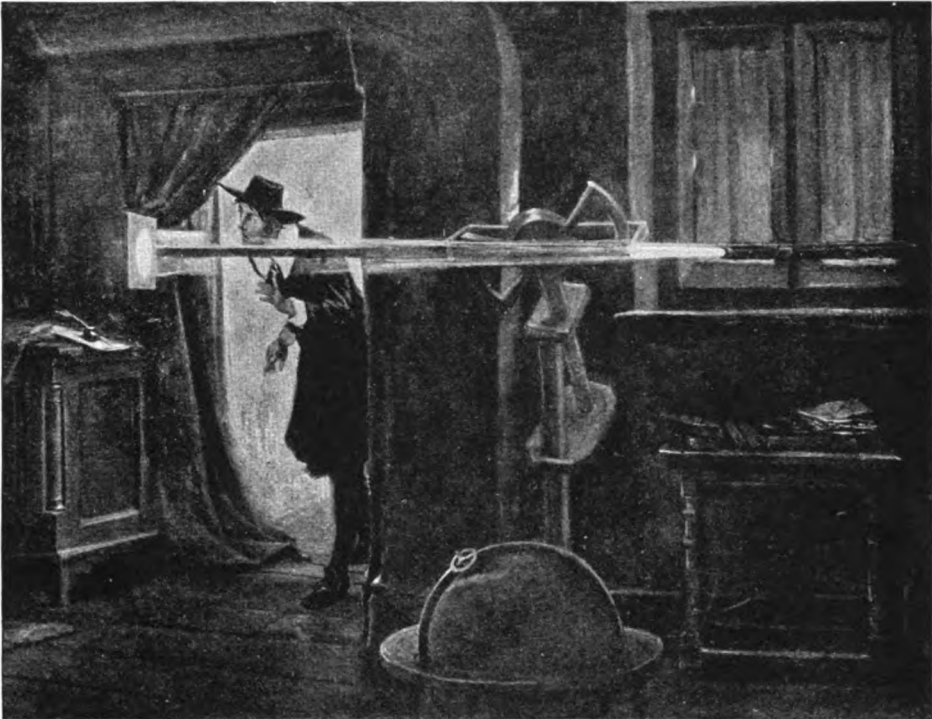
He was now an old man, and he knew that the torture awaited him if he disobeyed. So once more he swore. Then he was sent away as a prisoner, but was afterwards given his liberty, though spies watched him to the end of his days. He worked at his discoveries in the heavens, and wrote books of the highest importance, till he became blind. The man, who, more than any other, was to teach us what the heavens show us, was himself unable to see their glories. He died when seventy-eight, conquered, but not before he had given the world a great heritage of knowledge upon which much that we know of

natural science has been founded. We see how man after man built upon the foundations laid by those who had gone before. Copernicus and Kepler and Galileo prepared the way for Jeremiah Horrocks, "the founder of English Astronomy," who observed the transit of Venus, and Sir Isaac Newton, the great Englishman, who was born at Woolsthorpe, Lincolnshire, in 1642, and died in London in 1727. He was a dull boy at school, yet he beat all the other

he came to the conclusion that all things are drawn towards the centre of the earth. Then, going a step further, he discovered that the planets are drawn towards the sun in the same way. Little by little he discovered the law of gravitation, which explains the movements of the heavenly bodies.

We get a great lesson in patience and care from Newton. At the beginning he could not explain the movements of the moon and planets, because he had

THE FOUNDER OF ENGLISH ASTRONOMY WATCHING THE SHADOW OF A PLANET ON THE SUN



This picture, painted by Mr. Eyre Crowe, shows Jeremiah Horrocks, "the founder of English Astronomy," observing the transit of Venus. He darkened his room at the date—November 24, 1639—which he had alone predicted, and placed a tube out of the window pointing towards the sun. Then, by placing a board at the opposite side so that the disc of the sun was thrown on it and moving it as the sun moved, he was enabled to watch the shadow of Venus cross the disc of light. He was thus able to calculate the size of the planet. Though he died at the early age of 23, he made other useful discoveries in astronomy, and concerning the ocean tides.

students at mechanics and mathematics, and in course of time he became famous at Cambridge University. Galileo had given the world the law of bodies falling to the earth, but nobody had thought that such laws might affect the heavenly bodies. One day Newton, when sitting in his garden, saw an apple fall from a tree. "Why should that apple fall?" he wondered. "Why did it not float away or rise into the air?" He thought out the problem and worked at it until

no figures upon which he could rely, giving the size of the earth. No matter what answer to his problem he wanted, that answer always came out incorrect, through the absence of the necessary figures. Here he was, on the eve of one of the greatest discoveries in history, but he put aside this work for seven whole years. Then, in 1670, a scholar named Picard produced reliable figures as to the size of the earth. Newton took up his work where he had left it, and

finished it in triumph. By this time men were beginning to realise the importance of astronomy, and it was proposed to King Charles II. of England that astronomers should find the longitude at sea, and so enable sailors to steer in safety and with knowledge of the course they were following.

John Flamsteed, who was born near Derby in 1646, and died in 1719, had gained a reputation by his researches in astronomy, and he was consulted about the proposal. He said that so little was known of astronomy that the proposal could not be carried out. So in 1675 he was appointed the first Astronomer Royal, and Greenwich Observatory was built solely that he might make careful observations of the stars, to enable sailors to find their way in safety across the seas. He did his work nobly, making maps of the stars such as had never before been seen.

PULLING DOWN A GATE AT THE TOWER TO BUILD GREENWICH OBSERVATORY

The observatory was begun in a very small way. A gate-house at the Tower was pulled down to provide wood; iron and lead and bricks were taken from Tilbury Fort; and \$2,500, obtained from the sale of spoilt gunpowder, provided the money necessary for wages, and so forth.

Flamsteed had only \$500 a year, and had to buy his own instruments. This makes his success all the more wonderful, especially when we consider that his health was so bad that he could hardly do his work, let alone teach the pupils, whose fees were necessary to enable him to live. He quarrelled, as invalids do, with his best friends, among whom were Newton and Edmund Halley. The latter was a born astronomer. He was a native of London, where he was born in 1656, and before he was nineteen he had made such progress in astronomy as to be able to say that if a star were displaced in the heavens he would at once detect it.

When he knew that Flamsteed was making a map of the stars to be seen from our skies, Halley wished to make a catalogue of the stars seen in the southern skies, on the other side of the world. His father, who was rich, and proud of his boy, gave him money and consent, and young Halley rushed away from Cambridge without waiting

to take his degree, and spent eighteen months at St. Helena, making a map of 314 important stars which we on this side of the world never see. Afterwards he became Astronomer Royal in succession to Flamsteed, and did splendid work. He predicted the return of the comet which is named after him.

THE MAN WHO MADE ISAAC NEWTON PUBLISH HIS GREAT DISCOVERY

The most important thing he did, however, was to make Newton publish his great book. But for Halley, Newton never would have published it, and the world might have waited a century for the knowledge which that book, and that book alone, could give. Halley was made a captain in the navy in order that he might continue his study of the moon and stars, and the tides of the sea. He died in 1742.

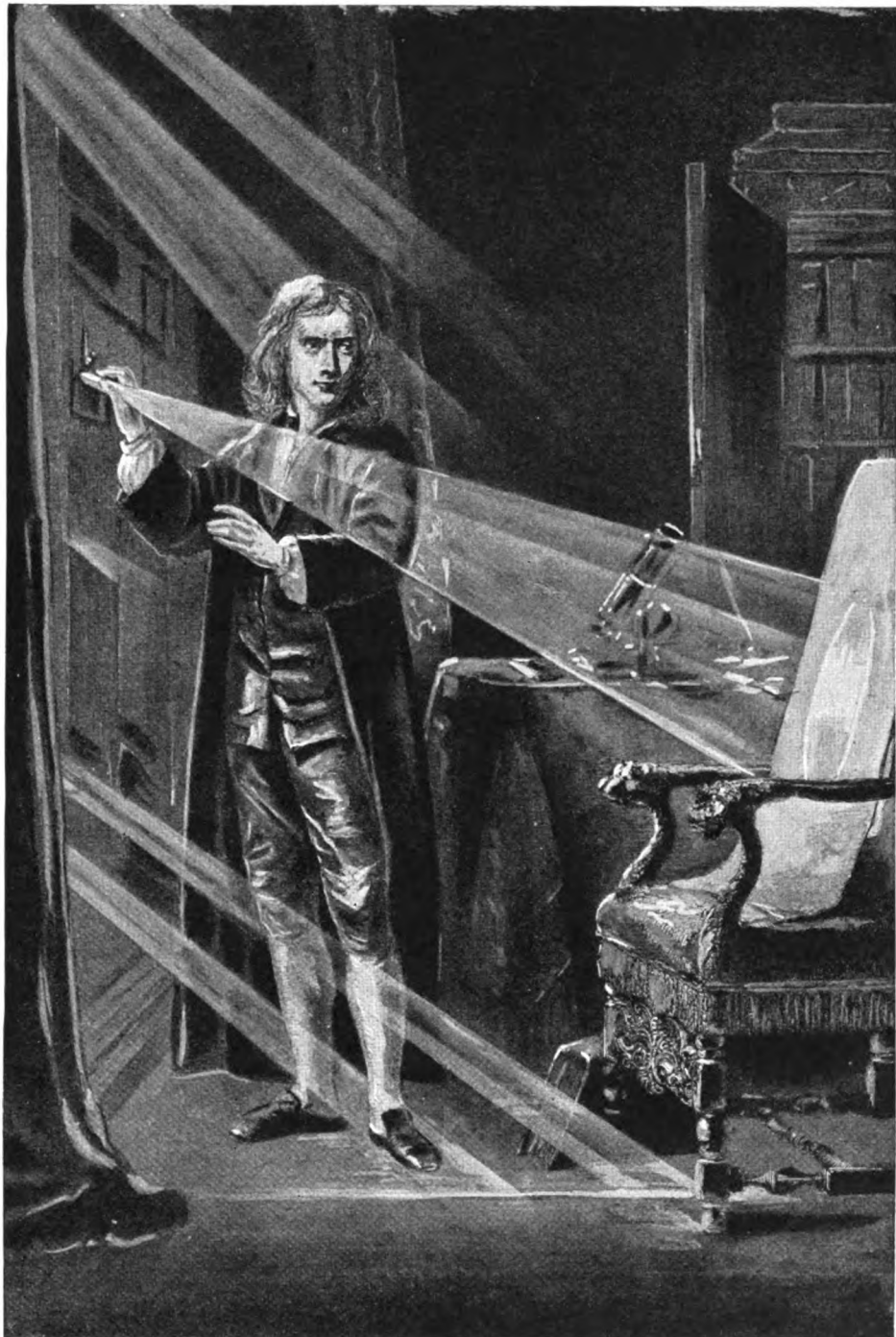
James Bradley was Halley's successor. A native of Sherborne, Dorset, he was born in 1693, and died near his birthplace in 1762. His most important work was the discovery of what is called the aberration of light. We know that light travels to us from the stars, at the rate of 185,000 miles a second. What we see is not the star, but the light of the star. That light takes a definite time to travel to us, and while it is on its way here, the earth is spinning on its path through space; and we see the light of the stars, not in the place where the star actually is, but where the star was some time before. This was the first clear proof of the earth's actual motion, and it was his discovery of this that made Bradley famous.

THE FIRST WATCH TO HELP THE SAILOR TO FIND HIS WAY AT SEA

The next great Astronomer Royal was Nevil Maskelyne, who was born in London in 1732, and died at Greenwich Observatory in 1811. He did more than any of the others to find the longitude at sea. In his time the first watch which would keep time at sea was made. That was a great thing. With the help of this watch, which carried Greenwich time out to any part of the waters, mariners had now only to observe the position of the heavenly bodies, and by comparing the time where they were with the time of the Greenwich watch, they knew exactly where they were at sea.

After Maskelyne came Sir George Biddell Airy. He was born at Alnwick,

SIR ISAAC NEWTON STUDYING SUNLIGHT



This picture shows Sir Isaac Newton, the great scientist, experimenting with light. When in a garden he saw an apple fall to the ground, and this set him wondering why it fell to the earth and not into the sky. This led to his discovery of the great law of gravitation, by which we can explain the movements of the earth and the other planets, and to many other wonderful discoveries concerning the laws of Nature.

Northumberland, in 1801, and died at Greenwich in 1892. He did an enormous amount of work in mapping the heavens and applying his knowledge to geography on land and sea. It was he who brought the science to the pitch which it finally attained at Greenwich, so that it has been said by a great man, Professor Newcomb, that if all the knowledge of this branch of astronomy were utterly lost, it could be entirely replaced at Greenwich Observatory.

WILLIAM HERSCHEL AND HIS BRAVE SISTER CAROLINE

We must not overlook the Herschels, the most brilliant family in English astronomy, though they had nothing to do with the Greenwich Observatory. The first was Sir William Herschel, who was born a poor boy in Hanover, in 1738, and was trained as a musician to play in a band. When he went to England he studied mathematics and astronomy. He was too poor to buy a telescope, so he manufactured one for himself. With this he made some famous discoveries, of which the greatest was the planet Uranus. He was greatly assisted by his sister, Caroline Herschel, one of the cleverest and most lovable women that ever lived.

Caroline's mother did not love her, but made her a drudge in her poor house, and would not have her educated. Her father, who *did* love her, gave her music lessons in secret. A little music and a little knitting—those were her only kinds of work, apart from scrubbing and cleaning, up to the time of her father's death. Then she toiled to learn dressmaking and other sorts of work, sitting up late at night, after she had done the housework. At last her brother, William, who was very fond of her, sent for her to come to him, and they lived at Bath, where he gave her singing lessons and taught her English and arithmetic, and she was much happier.

HOW CAROLINE HERSCHEL HELPED HER BROTHER TO BECOME FAMOUS

Caroline, on her part, learned to imitate the violin by humming with a gag between her teeth, so that she might perform at concerts and help the funds of the home. While her brother was making the telescope, Caroline became his cook and workshop "boy." She helped him to polish the glasses, she cooked his food, and actually fed

him with it while he was at work; she read books to him while he toiled. She sang at concerts with success, but gave up music to assist her brother in astronomy. She used to sit up all night with him to watch the stars. She copied his papers, helped him with his star-maps, kept the house, did the needlework, and entertained company. She used to fill up her spare time with polishing mirrors for his telescopes.

Seldom has there been another such woman as Caroline Herschel. She had her reward in time, for she herself became a wonderful astronomer, and made splendid discoveries. All her life was like a beautiful fairy story, right up to the end, when, her brother dying, she gave all her little savings to his son and family, and went back to live, not very happily, with her other relatives in Hanover. There she died, when ninety-seven years old, in 1848, honoured by all the great men of Europe, and beloved and admired as few women have been.

THE BOOK THAT MADE CAROLINE HERSCHEL WEEP FOR JOY BEFORE SHE DIED

The nephew to whom Caroline gave part of her money was Sir John Frederick William Herschel, her favourite brother's son, and a greater astronomer than his father. He carried on the work which his father and aunt had begun. He made a catalogue of all the stars seen in our skies, then he went to the other side of the world and made a catalogue of the stars seen there. It was the greatest joy of his life that he was able to send a copy of the great book to Caroline Herschel just before she died.

This was his most splendid work, and the dear old lady wept with pride and pleasure at seeing what her nephew had done. She was the more happy from the fact, that in the noble book there was the result of the work which she had begun under difficulties when cook and observatory "boy" to her brother, and had continued when herself a world-famous astronomer.

To such men and women, struggling often with poverty and difficulties that we can hardly understand to-day, we owe our knowledge of the skies, of which men can now make maps as clear and as certain as the maps we make of our own country.

The next stories of Men and Women begin on page 1725.

The Child's Story of THE EARTH

WHAT THIS STORY TELLS US

THE word "chemistry" really means the study of what happens when things are mixed or put together; and the study of the making and unmaking of compounds is all-important, for almost everything that happens on the earth and in living creatures depends upon it. In these pages we learn some of the ways in which the elements unite to make compounds, how these compounds are always made according to a fixed rule, which is really one of the great proofs that the elements are made of atoms, and how all the world over, and in our own bodies, compounds are being made and unmade every moment of our lives. We come now to what seems puzzling at first, but is really simple—the neat and useful way chemists have invented for describing compounds, and the changes that may happen when the chemist adds one to another. These *formulas* and *equations*, as they are called, are a little difficult at first, but so were the letters of the alphabet once, and almost everything else that is really worth knowing.

THE MAKING OF COMPOUNDS

WE have now said all that need be said about most of the principal elements; but the word chemistry really means mixing, and it is greatly concerned with what happens when different elements are added to each other. If things did not happen when this was done, the world would simply stay almost unchanged from moment to moment, nor could there be any life on it. So the making and unmaking of compounds is really the greater part of the whole study of matter.

What a compound is we already know, nor shall we confuse it with a mere mixture. Sometimes, when the chemist—that is to say, the mixer—mixes two elements, they simply remain mixed, and nothing happens. What is all-important is that very often, when he mixes them or puts them together, they combine with each other and form compounds.

We have studied some compounds already, especially the most important of them all, which is water. But the number of compounds that naturally exist in the world is far beyond anyone's counting, whilst the chemist can make a countless number more which do not exist at all in Nature. Some of these which he makes are extremely valuable to us. Therefore, we must learn all we can about the making of compounds, and also about the unmaking of them, which is equally important. The

CONTINUED FROM 1556



word to describe the making of a compound is, of course, composition, and the word to describe the unmaking of it is decomposition. Almost everywhere these two processes are ceaselessly going on, and the whole life and change of the earth depend upon them.

We can clearly describe a compound, whether it be a very simple one like water or common salt, or whether it be the most complicated compound in the world, like hæmoglobin, the red colouring matter of the blood. A mixture may contain any proportion of the things that make it up—a little of one or a little more, much of another or a little less. It is a quite indefinite thing, but a compound is never so. If it is really a compound it is a perfectly definite thing.

The proportions of nitrogen and oxygen in the air may vary to any extent, for air is a mere mixture. But the proportions of oxygen and hydrogen in the compound water are constant and exact, always and everywhere. Any given compound always contains the same elements in the same proportion, and it is this fact of definite composition that is the mark of any compound. Water always contains eight times as much of oxygen by weight as of hydrogen.

Already we have learned how to understand this, for we know that to make a compound a certain number

of atoms, one or more, of an element must combine with a certain number of atoms of another element—as, for instance, two of hydrogen to one of oxygen to form a molecule of water. There simply cannot be a compound with two and a half atoms of hydrogen to one of oxygen.

THE IMPORTANT DISCOVERY MADE BY A SCHOOLMASTER A HUNDRED YEARS AGO

The history of our knowledge is that this fact of the constant proportion of elements in a compound was discovered first by the Manchester schoolmaster, John Dalton, rather more than a hundred years ago. It was from this fact and others like it that he argued the existence of atoms which behave as we have seen that they behave.

We can understand the argument best by looking again at water. We call it H_2O , and we know that that means hydrogen two atoms, and oxygen one atom. But in this case, as in hosts of others, the two elements can form more than one compound with each other. There is, for instance, a compound looking rather like water, but really very different, which has two atoms of oxygen to two of hydrogen in each molecule, and therefore must be written H_2O_2 .

We know that this is so because, when we split this compound up, we find that any given quantity of it always contains twice as much oxygen as there is in water. That can only mean that the compound has the composition we have said—that it is made of molecules each of which contains twice as much oxygen as the molecule of water. But we never find any compound which contains one and a half times or two and a half times as much oxygen as in water. So long as oxygen and hydrogen are made of atoms that could never happen.

THE ELEMENTS NEVER MIX TOGETHER IN FRACTIONS OF ATOMS

Nitrogen and oxygen supply still better instances. They actually form five compounds with each other. When we weigh out the amount of nitrogen and oxygen in each of these, the proportions are always very simple. One of them always contains just twice as much oxygen as another. Another of them contains three doses of oxygen to two of nitrogen, and another five

of oxygen to two of nitrogen. But you see it is always three or five or two, never nearly five or a little more than three. Nowadays, then, we can say exactly how these compounds are made. It is simply a question of the number of atoms of the two elements in the molecule of the compound. We need not trouble about the names, but here are the five compounds, all in a row : NO , N_2O , NO_2 , N_2O_3 , N_2O_5 .

One of these you may, perhaps, know very well, and that is N_2O , for this compound is laughing-gas, which the dentist uses to kill—for a little while—our sense of pain.

This is the best instance I know to show that when elements combine with each other, they always must combine in simple proportions ; and if they form more compounds than one with each other, then the various proportions are simple multiples of each other. It is either a case of two parts to one, or of one part to one, or of three parts to one, or of three parts to two, or something of the sort ; but fractions never—never halves or quarters, or anything at all but whole parts.

A DISCOVERY THAT WILL MAKE JOHN DALTON'S NAME LAST FOR EVER

This great law, from which Dalton learned the existence of atoms, and the way in which compounds are made, has been known all over the world for a hundred years as the law of multiple proportions. It can only have one meaning—namely, that compounds are made of molecules with a definite number of atoms of each compound.

Wherever you find a specimen of, shall we say, N_2O_5 , there, if you split it up, you will find the exact proportions by weight of nitrogen and oxygen, which can only mean that this compound must be made of molecules, every one of which consists of exactly two atoms of nitrogen and five of oxygen. If there were no such things as atoms, the elements could not behave in this way ; therefore there must be atoms, and there are. That was the great argument and the great discovery which will make the name of Dalton last as long as time.

If we call the weight of the atom of hydrogen one, then the atom of nitrogen is fourteen, and the atom of oxygen sixteen. So in thirty ounces of NO ,

you will always find exactly fourteen ounces of nitrogen and sixteen of oxygen; and the proportions by weight in the other compounds you can easily reckon for yourself if you remember the composition of the one you require.

WHAT A FORMULA IS, AND HOW IT BRINGS A PICTURE TO THE CHEMIST'S MIND

Names like H_2O , NO , CO_2 , and so on, are called *formulas*. Each of them is the formula of the thing it describes. That is not a very difficult word, and it is used every day in chemistry. After this, we shall be able to talk about the formula of water, the formula of carbonic acid, or anything else we please. When you look at a chemical formula like H_2O , and compare it with what you find when you decompose water, and notice the proportions of hydrogen and oxygen in it, you find that the formula exactly expresses to anyone who understands it, in very little space, the fact that in water everywhere are eight parts of oxygen by weight to one of hydrogen. An atom of oxygen is sixteen times as heavy as one of hydrogen.

Now we must look at a few of the ways in which compounds may be made. The simplest we know quite well already. It is *direct union* of the elements that make the compound. We know it in the case of burning or combustion; and when we use these words we usually mean that, in the course of this direct union, some light is given out. When hydrogen unites with oxygen to form water, it gives a dim blue flame which is intensely hot. But compounds may be made by burning with other things besides oxygen. Hydrogen, for instance, burns with a pale green flame in the gas called chlorine, and produces what we call hydrochloric acid, which has the formula HCl . Our study of the compound common salt, or $NaCl$, will tell us exactly what HCl means. Then copper can similarly be burnt in sulphur vapour, and so can iron.

THE CURIOUS BEHAVIOUR OF SOME COMPOUNDS IN HEAT AND LIGHT

Another very common way of forming compounds is by making one element turn out another from a compound, and take its place. For instance, we can form the compound water by acting upon the compound of some element with oxygen by means of

hydrogen. The hydrogen turns out the other element and takes its place with the oxygen, forming the compound water; or, to take another instance, if we take an element like zinc, and add it to hydrochloric acid, it turns out the hydrogen and takes its place, and we have the new compound formed, zinc chloride—the chloride of zinc instead of the chloride of hydrogen.

Then we can often make compounds by simply heating other compounds. Often a very complicated compound will break up, when it is heated, into two or more compounds that are less complicated; or we may just drive away a certain proportion of one of the elements in the compound, and so we may get something new. For instance, if we heat the peculiar compound which has the formula H_2O_2 , we drive away exactly half its oxygen, and that is one way of making our very old friend, the compound water. Indeed, if you want to keep a specimen of H_2O_2 , you have to keep it cool and away from the light; nor must you let anything that likes oxygen get near it, or that thing will certainly help itself to half the oxygen of H_2O_2 , and leave only H_2O behind.

HOW COMPOUNDS PLAY THE GAME OF EXCHANGING PARTNERS

One of the special uses of H_2O_2 , and of some other things like it, is that they very readily give up oxygen to almost any sort of unpleasant stuff which we want to get rid of, perhaps because it has a bad smell, and so change it into something harmless.

You will say that, after all, there is plenty of oxygen in the air, and why should it be necessary to use H_2O_2 to give oxygen to things? The answer is that when oxygen leaves one of its compounds—and this is true of all the elements as well as oxygen—it is much more active and powerful than when it is in its ordinary state. This has been explained already.

Yet another way of making compounds is perhaps the commonest of all; and we must understand it. It has the rather long name of *double decomposition*, but is quite simple really. If we mix two compounds, it often happens that they exchange partners. That is all. Anyone who plays games knows what exchanging partners means; and when that happens

in chemistry we call it double decomposition. Of this there are thousands of instances, as when we take the two pairs, one made of oxygen and mercury, and the other of chlorine and hydrogen. They exchange partners, the mercury takes the chlorine, and the hydrogen takes the oxygen, so that we have chloride of mercury and water. That is a good instance of a double decomposition, and it teaches us something.

THE PARTNERS THAT ARE FOND OF EACH OTHER COME TOGETHER IN THE GAME

For we may say in general that, whenever chemical changes like this occur, there is a certain bias, or tendency, in their direction. Some compounds are strongly united, and others weakly united; and the tendency always is to form the compounds that are strongly united. Do you not think that, in exchanging partners in a game, the people who are fondest of each other are very apt to get together? If you have not noticed that, I am sure I have.

Now, that is the rule in chemical changes, and especially in double decomposition. If the chemist knows what compounds are strong and what compounds are weak, if he knows which elements are specially fond of other elements, then he can usually foretell what will happen when he mixes two compounds. Of course, nothing may happen. The partners in the two compounds may be so pleased with each other, so to say, that they will not change. Indeed, a double decomposition will often go in one direction, but cannot be persuaded to go backwards.

HOW TWO CLEAR LIQUIDS MIX TOGETHER AND MAKE A BRIGHT COLOUR

Now, in this instance we have given, we notice that water is one of the things that is made. We know that water is one of the strongest compounds in the world. Oxygen and hydrogen are never better pleased, so to say, than when they are together. This is a case where "three is company"—three atoms. Thus, in a double decomposition, if there is any chance of forming water, we may be quite certain that water will be formed, and that the other partners, whatever they are, will probably have to join company whether they are very fond of each other or do not care at all.

Another thing is specially to be noticed. As a rule, in a double decomposition, anything that is solid—that will not melt in water—is specially apt to be formed. If water is formed also, then this thing appears as something suspended in the water. After a time it settles to the bottom, and then, by pouring the water off or filtering, we can get the new thing by itself. So it is the commonest thing in the world for a chemist to take two clear liquids—each of which may be colourless, perhaps—add one to the other, and then, in an instant, there may appear perhaps a bright red or brilliant white cloud, which is the new thing formed by the double decomposition that occurred. In the case we have mentioned the chloride of mercury is white, but cannot be dissolved in water. If we allow the water to evaporate, then we get the white salt by itself. It is an intensely poisonous but very valuable substance, and this is one of the ways of making it by double decomposition.

WHAT THE CHEMISTS FOUND IN LOOKING FOR SOMETHING TO MAKE GOLD

It very often happens, in double decomposition and in other cases, that a solid is produced in a fluid, and gradually falls to the bottom; and we have a special word for what happens then. We all know what a precipice is. It is a place where the land falls suddenly, and if a man, or anything else, falls over it we say that he was precipitated. Now, when a solid is formed in a fluid, and falls to the bottom, we always say that it is precipitated, although it usually falls very slowly, and sometimes does not fall at all, but hangs in the fluid; and the solid which forms and usually falls is called a precipitate.

It is a long and rather clumsy word, but it was used many centuries ago by the old founders of chemistry, when they were looking for the thing which should make us all young again, and for the other thing which was to turn everything it touched into gold. They did not find either of those things, but they noticed a great many facts, and named them, usually with rather fanciful names. One particular thing formed in the way we have described is called white precipitate. It is highly poisonous, but very useful to apply to the skin when little creatures that should not

be there are living on it. It is poisonous to them, and that is what we want. Then there is red precipitate, and so on. After this, we shall understand what we mean when we say that something is precipitated. Nowadays chemists often turn the same idea into English, and say instead that in certain chemical operations such and such a compound is thrown down or thrown out. "Thrown out" rather expresses the idea, as if the new compound were thrown out by the water which declined to hold and hide it, as it does when it dissolves a lump of sugar.

THE SIGNS USED BY CHEMISTS TO SHOW WHAT HAPPENS TO THE COMPOUNDS

Now, one of the special uses of formulas in chemistry is that they allow us to write, in a very short and neat way, an account of what happens when a chemical change goes on. This change is called a reaction. We say that, for instance, when hydrochloric acid is added to carbonate of soda, there is a reaction. Certain conditions must be present, of course. For instance, scarcely any chemical reaction will occur at the temperature of frozen air. Many chemical reactions require much heat to be used, and so on. These things cannot be expressed in the way we are now going to study, but that way does express what happens, and it does so exactly.

We know that the sign = means *equals*, and we know that the sign + means *added*. So if we write $2 + 3 = 5$, we call that an *equation*, for it states that certain things added together are equal to something else. Now, in rather the same way, it is possible to write a chemical equation; and in the study of chemistry all the world over these equations are used many times every day. The sign =, when used in a chemical equation, means that the things on the left of it are turned into the things written on the right of it when the change comes about.

THE STORY OF GREAT HAPPENINGS TOLD BY $\text{CaCO}_3 = \text{CaO} + \text{CO}_2$

These equations may be very simple or very complicated. Let us take a very simple one to start with. We all know what marble is, and we all know what chalk is. These two things, and many others, are made of carbonate of lime. The Latin name for lime is

calcium, and the letters to express calcium are Ca. (We cannot use just C alone, for we know that that stands for carbon.) Now, the formula of carbonate of lime is CaCO_3 . If this is heated, it is decomposed and split up into two new compounds. One of them is called quicklime; it has the formula CaO , which shows us that it is an oxide of calcium; the other substance that is formed is our old friend carbonic acid, CO_2 . Now all this can be said in a line of what we call a chemical equation:



Now, the question in every case like this is whether the equation is a real one or a sham one, and that is easy to test. The "equation" $2 + 3 = 6$ is a sham one, for the very good reason that there is more on one side of it than is accounted for on the other side. In every chemical equation, as in every other kind of equation, we must be sure that everything stated on one side is fully accounted for, and no more, on the other side. If that is so, the equation is a real equation. It does not follow that the change which the equation describes happens, for something quite different may happen. But at least it might happen.

NOTHING COMES FROM NOTHING, AND NOTHING IS MADE INTO NOTHING

On the other hand, we know that if there is something on one side of what pretends to be an equation that is not accounted for on the other side, then certainly what that equation describes does not happen. If it did, it would mean either that some atoms came into existence out of nothing, or that some atoms were destroyed and made into nothing. Now we know that nothing comes from nothing, and that nothing is made into nothing. Everything must be accounted for, where it has gone to, and where it comes from. If we can account for it, we may or may not be right, but if we cannot do so, we are certainly wrong.

So we must look at our equation, and carefully count the atoms of various kinds, on one side and on the other, and we must see that they exactly correspond, both in number and in kind. It will not do if, in place of an oxygen atom on one side, there is a carbon atom on the other. There must be as many of each kind

of atom on one side of the equation as on the other, or it is false. The true test whether we understand a chemical reaction is whether we can write a true equation of it. As long as we fail to do this, we do not understand the reaction.

Now will you please count the equation given on previous page, and say whether it is true or false? You will find that there is one calcium atom on each side, one carbon atom on each side, and three oxygen atoms on each side. It is a true equation; it fully and truly describes what it is that happens when we heat marble or chalk; it accounts for all the atoms that are engaged, and for no more. Here is another equation:

$$C_2H_2O + H_2NO = C_2H_2NO + H_2O_2$$

It does not in the least matter whether these compounds exist, nor whether you know their names. But suppose they exist, I want to know whether that reaction happens. Will you please find out before you read any further?

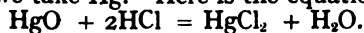
I know the answer you have decided upon; but suppose, instead of H_2O_2 , at the end of the equation, we wrote simply H_2O —that is to say, instead of peroxide of hydrogen, simply water.

THE BIG 2 AND THE LITTLE 2 AND THE DIFFERENCE BETWEEN THEM

Now, is it possible that that reaction might happen? As a matter of fact, the one of these two that can happen does happen, and it is a simple reaction compared with some, which would take many lines of this book to write.

Now let us take an instance of an equation that describes a double decomposition, and we may as well take one that has been already mentioned.

All we need to know is that the letters for mercury are Hg. The Latin name for mercury is *hydrargyrum*, which simply means water-silver, for that is what it looks like. But we cannot take H for mercury, since that has been used up already for hydrogen, so we take Hg. Here is the equation:



This is the equation that describes what happens when hydrochloric acid is added to oxide of mercury. The oxygen and the chlorine change partners, so that we get chloride of mercury and oxide of hydrogen, which is water. This equation, of course, you must test. There is something new about

it not seen in any equation we have had yet, and this must be explained, because it has to occur in almost all chemical equations. The big 2 in the first half of the equation has not the same meaning as the little 2's which we are so familiar with in the case of water. The big 2 means that in order to make the equation true, we must take two molecules of hydrochloric acid to add to one molecule of oxide of mercury.

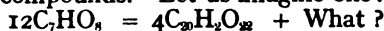
A SIMPLE RULE THAT HELPS US TO REMEMBER AND UNDERSTAND

That is so. We have to take the quantities of these two substances that the equation expresses if we want to get a complete result that changes the whole of both substances we start with. So, of course, it means that the big 2 applies to the whole of what is written after it, as if it were written $2(HCl)$, or H_2Cl_2 . This means that on the left-hand side of the equation we have to reckon with *two* atoms of hydrogen and *two* atoms of chlorine. Remembering that, perhaps you will now test the equation and see whether it is a real one.

The simple rule to remember is that the little figures written after a letter mean so many atoms of what that letter stands for. If there is no figure after a letter, that means that it is just one atom—we do not take the trouble to write the figure 1. But a big figure written before the formula of a compound means that we are taking a molecule of that compound so many times over, and so, if we write $3Na_2CO_3$, we have really *six* atoms of Na, *three* of C, and *nine* of O to account for on the other side of the equation.

PRACTISE WRITING DOWN EQUATIONS FOR YOURSELF AND TESTING THEM

This is not really difficult, and it is quite necessary to understand. You can practise writing equations on a piece of paper and testing them. Take any letters you please, and imagine any kinds of compounds. Let us imagine one:



Suppose that this happened, and that just one other compound were required to complete the equation, what would it be, and how many molecules of it would you require? After all, it is only a new kind of sum.

The next story of the Earth begins on 1797



THE FORBIDDEN ROOM

THERE was once a magician who took the form of a beggar and went from house to house stealing all the prettiest of the girls, none of whom ever came back again.

One day he begged for scraps of food at the door of a man who had three very pretty daughters, and the eldest one gave him a piece of bread. When she was not looking he touched her on the arm, and against her will she found herself compelled to jump into his basket. Then he took her to his house in the middle of a thick forest, where everything was magnificent, and she had all that she could possibly desire.

After some days he told her that he was going on a journey, and handed to her the keys of the house, saying that she could go into all the rooms except one. If she entered that room, she would die. At the same time he gave her an egg, and told her to be very careful not to lose it.

No sooner was he out of sight, than she started to go all over the house, and found the rooms filled with lovely things. At last she came to the door of the forbidden room, and, after hesitating for a while, her curiosity got the better of her, and she went in. To her astonishment, she found there a number of girls imprisoned by the magician. They lay as if asleep, and, frightened by their stillness, she fled from the room and rushed away.

In her terror she dropped the egg that she was holding in her hand.

CONTINUED FROM 1534

It did not break, but on picking it up she found that it was smeared with red, and, in spite of all her attempts, she could not clean it.

A few hours later the man returned, and asked at once for the keys and the egg. As soon as he saw the red mark on the egg, he knew that she had been into the forbidden room. Throwing her on the ground, he dragged her back into the secret chamber, and imprisoned her with the others.

He then set off again to the house where he had begged, and this time he captured the second daughter. She, too, yielded to curiosity, and met with the same fate as her sister.

The wizard then captured and brought away the remaining sister; but this one was very cunning, and when, in her turn, she received the keys and the egg before the man went out, she at once put away the egg carefully in a cupboard. Then she took the key and went into the forbidden room to see what it contained.

Here she was astonished to see the floor covered with girls fast asleep, among them her two sisters. But, being wiser than the others, she took care of the egg and kept it clean. When the wizard came home, she ran to him with the keys and the egg, and seeing that the egg was clean, he exclaimed, "You shall be my wife; for you have stood the test well."

But the magician was now no longer able to do as he liked, for his bride had broken his power and was able to

do with him whatever she would. So she went into the forbidden room and woke up the sleeping prisoners, who had been held bound by the wizard's spell. Then she said to him :

" Before I marry you, you must carry a basketful of gold to my parents."

Taking a very large basket, she put her two sisters into it and covered them over with gold coins so that they could not

house, where he left his basket. While he was on his journey his intended bride took a painted head and decorated it with flowers, placing it at an upstairs window, as if it were someone looking out. Then she set free all the wizard's victims, and sent out invitations to the wedding. Next she covered herself with feathers, so that she looked like some queer bird, and no one could recognise



In her disguise, the magician's wife met the wedding guests, who said, " Fairy bird, from whence do you stray ? "

be seen. Next she told the man to carry the basket, and be careful not to stop anywhere on the road, as she would certainly be watching him from her little window. The man put the basket on his shoulder and started ; but he found it so heavy that he was ready to drop with fatigue. So he sat down to rest ; but instantly a voice from the basket said, " I am watching from my little window." Thinking it was his future wife calling after him, he started up and struggled on. Every time he tried to rest, the same thing happened, and at last he reached the parents'

her. After this she started from the house

and met some of the guests, who said :

" Fairy bird, from whence do you stray ? "

" I came from the fairy's home this day."

" And what has become of the young bride, say ? "

" She has garnished the house all in and out, And now at the window she's looking out."

When the wizard returned, he looked up and saw the head at the window, and, thinking it was his future wife, went into the house. At once the friends of the three sisters, who had come to revenge their wrongs, locked the doors, and set the house on fire. And that was the end of the wizard and his forbidden room.

THE STORY OF LADY ANNE GRIMSTON

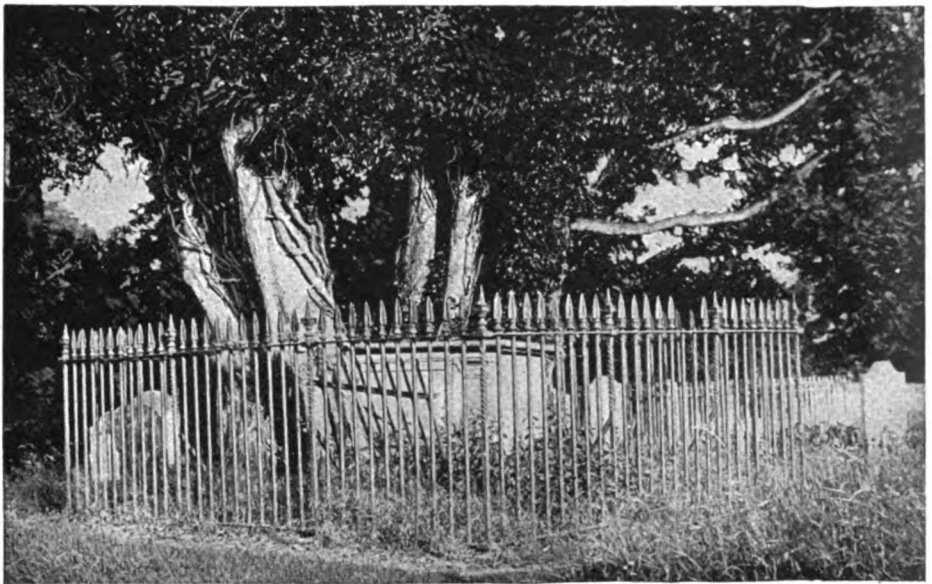
IN a great house in Hertfordshire Lady Anne Grimston lay dying.

She was a proud and obstinate woman, who had enjoyed her riches, her lands and the society of her friends while she lived, and had cared nothing for the more important things which do not pass away. And she died as she had lived, with none of the comfort that comes to all good men and women when they leave their friends and pass out of this world.

She believed that when she had passed away from her friends, when her houses, and riches, and lands were gone, she herself, and the life that was in her, would be gone, too, gone for ever, utterly

marble—buried and forgotten. But not quite forgotten; for one day, many years after, the marble slab over her grave was found to have moved from its position. The builders fixed it firmly in its place again, and left it, thinking it quite secure.

Again the heavy marble slab tilted slightly on one side, and in the middle was a crack, with a tiny bunch of leaves bursting through. The crack was closed with cement and the slab put back again; but again the slab was lifted up, the crack opened wider than ever, and the thin trunk of a tree appeared. They repaired the crumbling tomb, and built around it tall iron



GREAT TREES GROWING OUT OF THE GRAVE OF LADY ANNE GRIMSTON IN TEWIN CHURCHYARD

destroyed. Her friends tried to point out to her how terrible and impossible this was, how certain it was that she would live again, as the roses live again. Just as the trees and flowers in the field live again after their long sleep, so, said her friends to Lady Anne Grimston, she, too, would live again, and the life that was in her would never end.

But Lady Anne Grimston was proud and unbelieving, and she said to her friends, "I shall not live again. It is as unlikely that I shall live again as that a tree will grow out of my body." Lady Anne Grimston died, and was buried in a strong tomb made of

railings to hold the masonry together; but the young tree made its way, breaking the masonry in two, destroying the walls of the tomb, and tearing the heavy iron railings out of the ground.

And to-day, growing right from the heart of Lady Anne Grimston's grave, in Tewin churchyard, half an hour's ride from King's Cross Station, is one of the biggest trees in England, four trees growing from one root. The heavy iron railings are fast through the trunk of the tree and cannot be moved, the marble masonry of the tomb is shattered to pieces, and to-day Lady Anne Grimston's grave is a heap of broken stone and twisted iron bars.

THE STORY OF BRAVE WILLIAM TELL THE MAN WHO FACED A TYRANT

THERE walked one fair day across the market square of Altdorf, in Switzerland, as fine a looking man as one could wish to see. Tall and straight, broad and shapely, with ruddy, bearded face and proudly-held head, this man of the mountains strode with clean, swinging stride across the square, with a look of bright happiness in his eyes, and a cheerful word of greeting for his friends. Many turned to say, "There goes William Tell, the crossbowman of Bürglen."

This man, who was said to be the finest crossbowman in Switzerland, and the best handler of a boat on the storm-swept lake of Uri, lived quietly in a mountain cottage, with a wife who shared every thought of his heart, and children for whom it was his pleasure and delight to work. He hunted deer in the mountains, and went a-fishing on the lake. His children never lacked good food and decent clothing. His home was trim and neat. There was no family in that district more firmly established in peace and contentment.

Tell had sold the pack of deerskins which he had brought with him to Altdorf. He was on his way now to buy winter clothing of warm wool for his children. He had money, enough and to spare, and he was in a mood of great happiness. In an hour or more he would be singing a song on the road to his mountain home. Suddenly he felt his arm seized, and found himself in the grip of an Austrian soldier. In another instant he was surrounded. The soldier who had seized his arm pointed to a pole with ducal cap on the top. "It is death not to bow to that cap, and you know it!" said the soldier.

A silence fell upon the whole square. People left off their trading and crowded round the group. A thing greater than trade was at stake now—a man's freedom, a nation's liberty. William Tell had flushed a deeper red. He brought his eyes from the cap on the pole to the soldier's face. "I have done nothing unlawful," he said slowly.

"You have insulted the majesty of the Duke!" said the soldier.

William Tell kept a steady eye. "Why," said he, "should a man show more reverence to an empty cap than

to any empty cloak or a pair of hose?" At this there came from behind the soldiers the figure of the Governor of the district, the tyrant Gessler. It was this Gessler who, set over the once free Swiss by their conqueror and oppressor, the Duke of Austria, had trodden liberty under foot, had murdered and imprisoned all who stood against him, and, as a last barbarity, had declared that everyone who did not do homage to the badge of Austrian rule set up on the pole in their marketplace should die. William Tell faced the Governor. He feared no man. No one could break his proud spirit. In his mountain he had brooded upon the shame of the slavery which enchained his country, and had already spoken with his friends of resistance. Never, never, would he do homage to the hated badge of the tyrant's mastery.

"So you would make a jest of the sign of majesty?" asked the Governor, approaching him, while the soldiers saluted. At that moment there came from the crowd a child's cry of "Father! Father!" The crowd turned about, opened out, and presently William Tell's little son, who had come without leave to the fair, was rushing to his father. The Governor caught the boy's arm. "Is this the brave traitor's son?" he asked.

"Hurt him not," said Tell. "He is my firstborn."

"Oh, I won't hurt him!" answered the terrible Gessler. "If any harm should come to him, it will not be by me, but—by you." A horrible smile lighted his eyes. "Here," said he to a soldier, "take the boy and tie him to the trunk of that linden-tree over there, and place an apple on his head."

"What is this for?" demanded Tell.

"I am told that you are called the crossbowman of Bürglen," replied the Governor, "and I should like you to give me an exhibition of your skill. Your life is forfeit. But I am in a merciful mood; I will give you a chance of redeeming it. Come, listen to me. If at this distance you can shoot an arrow so as to split the apple on the curls of your firstborn, I will let you go free. If not—if you miss the apple, or kill your child—I will execute you, here and now."

THE MAN WHO MIGHT HAVE BEEN KING



William Tell, who is seen here with his little son, was arrested for refusing to bow to a tyrant set over the Swiss people by their Austrian conquerors. He was offered his freedom if he would shoot an arrow at an apple placed on the head of his little boy, which he did. Though arrested again, he escaped, killed the tyrant, and freed the country. They would have made him king, but he went back to his home in the mountains.

"Have you no mercy?" cried Tell, trembling with indignation. "And do you think I will attempt to save my own life at the risk of my son's?"

"I am doing you a favour," replied Gessler. "Think. By a lucky shot you may save your life, and go home!"

Tell held out a hand which was trembling. "How can a man who loves his son aim with a steady hand an inch above his temples? Ah, look at the child! My lord, look at him! He is no kin of yours; you know nothing of the pretty ways by which he has climbed into a father's heart, the innocence of his eyes, the beauty of his face! Am I to risk that life?"

Gessler laughed brutally. "Well, you either shoot an arrow, or die."

"Then I will die."

"And first your child shall have his neck wrung before your eyes!"

A blinding passion of indignation overswept the noble soul of the mountaineer. "Give me the bow," he said. "One thing in mercy I ask. Let the child's face be turned away from me. Let me not see his eyes fixed upon me."

A way was cleared between father and son. A dense multitude stood on either side. The boy, with his face to the tree, bound by ropes to its trunk, felt the apple weigh like lead upon his head. A dreadful silence fell upon the market square. William Tell chose two arrows. One he thrust in his girdle; one he fitted to his bow-string. Then for a moment he stood, a little bowed of shoulder, with his eyes downward; he was praying. You might have heard a leaf fall, so still was the place. Then Tell raised his head; his eyes were steady; his hands had become still; his face was like iron. He brought the crossbow to his shoulder and laid his eye to the feather of the shaft. *Twang!*

The arrow shot forward, and, as it were at the same moment, buried itself deep in the tree. The apple fell in equal parts on either side of the boy's head. A roar of cheering went up to heaven, and Gessler turned to Tell.

"A good shot, traitor!" he said cruelly. "But tell me, for what reason did you take two arrows?"

Tell laid his hands upon the arrow in his girdle. "If the first arrow had hurt my child," he said, "this one by now would be through your heart!"

"Oh! So I run in danger of my life?" said the Governor. "But I will keep the pledge I gave you. You shall not die. I will give you your life. But the rest of that life you will spend in the dungeons of my castle, and your bow-string will not then be a danger to me."

At this Tell was seized again, and rushed by the soldiers through the scowling mob to the quay, where the Governor's ship was moored. But it chanced that as the ship crossed the lake of Uri a storm arose, savage and wild, and it seemed as if everyone would be drowned. The Austrians could not manage the vessel, and began to abandon hope of saving her. In their panic they remembered that Tell was reputed the best handler of ships in that part of the world, and spoke to the Governor. "Loose him, and let him take the helm," said Gessler. Tell got the vessel to right herself, and set her head for the opposite coast. But he was now thinking, not of Gessler and the Austrian soldiers, but of freedom—his own freedom, and the freedom of Switzerland. He would get free, and save his country.

He brought the ship close to a rock that jutted out from the coast, and then, as it shot past, he sprang suddenly upon the rock, and left the Austrians to save themselves. Swift of foot, he scaled the rocks, climbed the cliff, and made his way across the mountains to a place on the road, which Gessler, if he saved himself, would have to pass. Here he lay concealed amongst the bushes, with an arrow fitted to his bow-string, his heart set on delivering Switzerland from the tyrant. As he waited, darkness fell among the mountains. Presently there came to him the tramp of feet. "And if I live to return to Altdorf," Gessler was saying, "I swear I will destroy the whole brood of this traitor Tell, mother and children, all in the same hour!"

"You shall never return!" said Tell to himself. And, as the soldiers went marching on, he let fly the arrow, and Gessler dropped dead in the dust.

William Tell inspired the rising of the Swiss people, which led to the overthrow of the Austrians and made Switzerland a free country.

They would have made him king, but he shook his head, and went back to his home among the mountains, which was more to him than many palaces.

LITTLE STORIES ABOUT FLOWERS

Almost every flower has a story, just as almost every place has a legend. They are "made up," perhaps, as the legends are, but they are often very beautiful.

THE CORNFLOWER

QUEEN LOUISA OF PRUSSIA was a brave, beautiful lady. The great Emperor Napoleon came and conquered her country, and oppressed her people, and she struggled bravely against him.

At last, however, her chief city, Berlin, was captured by the enemy, and she barely managed to escape with her little children, and hid in a cornfield. Her children were frightened, and began to cry, and Queen Louisa was afraid that someone might hear them. So she took some of the blue cornflowers and twined the blossoms into wreaths and crowns for them, and in this way made the children forget their sorrow.

One of her children was named Wilhelm, and he afterwards conquered Napoleon's nephew, and was made the first German Emperor, and he took as his emblem the blue cornflower. Now all the German people wear it on festival days, as the emblem of German unity, and as a souvenir of their brave Queen Louisa of Prussia.

THE ENCHANTED THORN

ONE of the thorn-trees at Newland's Corner, on the Surrey downs, is enchanted. Some maidens who danced around it one summer night were carried off by the fairies and never seen again. But a few years ago two shepherd lads were sitting there, when the thorns were white with blossom, and one of them said :

"We'll now see if this thorn is really enchanted. I'll dance round it, and you sit and watch what happens."

Instead of dancing in the ordinary way about the tree, however, he danced round it backwards. When he had done, the earth opened, and a green table came up. On the table were delicate dishes of meat and fish.

"Don't touch it; it is fairy food!" said one of the shepherd boys.

But his daring companion feasted to his heart's content, and the table then sank into the earth. He is now one of the richest farmers in England, for the food was lucky food, but his companion is still only a shepherd.

THE CHRYSANTHEMUM

IN the Black Forest lived a peasant named Hermann. Going home one Christmas Eve, he saw a little boy lying in the snow. He carried him to his wife and children, who, in their pity, gladly shared with him their little feast.

All night he remained in the hut, and in the morning the guest revealed himself as the Christ-child, and vanished. When Hermann next passed the place where he found the Child, wonderful flowers were growing out of the snow. Gathering a handful, he gave them to his wife, who called them chrysanthemums, meaning Christ-flowers, or, more correctly, gold-flowers. Ever after this on Christmas Eve a part of the feast in Hermann's house was set aside for some poor child, in memory of their guest.

THE ROSE OF JERICHO

THE rose of Jericho is also known as the Resurrection flower, for it is supposed to have the property of dying and coming to life again. Its origin is described in a very pretty legend.

When the infant Jesus fled from Bethlehem with His mother Mary and Joseph, to avoid the massacre of all the young children by King Herod, the party are said to have crossed the plains of Jericho. When Mary alighted from the ass on which she was riding, this little flower sprang up at her feet to greet the infant Saviour whom she carried in her arms.

Flowers are said to have thus sprung up at all the places where the Holy Child rested.

All through the Saviour's life on earth the little rose of Jericho continued to flourish, but when He died upon the Cross all these flowers withered and died away at the same time. Three days later, however, our Lord rose again from the tomb, and at the same time the roses of Jericho came to life, and sprang up and blossomed all over the plain as an emblem of the joy of the earth because Christ was risen.

And because of these happenings, the rose of Jericho has ever since borne also the name of the Resurrection flower.

THE UGLY DUCKLING



AN old Mother Duck, who was very proud of her handsome family, was very disappointed when another little one was born who was so ugly that everybody called him the Ugly Duckling.

"I never imagined," she said to a friend who came to visit her, "that I should ever have such an ugly child. Just look at the others, how pretty they are and how gracefully they move!"

Soon the ducklings grew old enough to have their first swimming lesson.

"Quack, quack!" cried the Mother Duck, and out they all came, as fine a brood of ducklings as any mother could wish to see. And behind them came the Ugly Duckling, alone and forlorn.

"Do you not see your young brother?" said the Mother Duck.

"He can't be our brother," they replied scornfully. "He is so ugly that we can't bear to look at him."

But when they found that he took to the water like a brave young duck should, and beat them all at their games and races, they were jealous of him, and angry that one so inferior in appearance should in any way excel.

One day the Mother Duck took her children to visit some friends in a neighbouring farmyard. They had not been there long before the Ugly Duckling found everybody staring at him, and one old duck even flew at him and bit him on the neck.

"You are not like the rest of us," he said. "You are so big and ugly. Why do you come here?"

"Let him alone," said the Mother Duck. "He is not pretty like my other children, but he is good-natured, and he swims better than any of them."

But when the mother's back was turned, the Ugly Duckling had a bad time of it. They all made fun of him, and gave him sharp pecks.

"They all hate me because I am ugly," sighed the Ugly Duckling, "and it is through no fault of mine. I am evidently not wanted. I will go away."

And so when no one was looking he stole away. On and on he went until he came to a great moor, where he saw a number of wild ducks who came to have a look at the stranger.

"How do you do?" said the Ugly Duckling politely.

But they stared at him for some time without answering, and then one said:

"How ugly you are!" And then they all began to laugh. But just at that moment there came a sound which terrified the poor duckling.

"Pop, pop!" went a gun, and down dropped the wild ducks one by one.

The smoke from the guns blew across the water and choked him, and as it faded away in the air the duckling was terrified to see a huge dog dash into the water and come swimming towards him. He was too frightened to move, but to his surprise the animal, with a sniff, passed him and left him trembling from head to foot with fright.

"I am so ugly that even a dog cannot bear to look at me," he thought, and he shivered and dared not move till the sun had gone down, lest other strange dangers should come upon him.

When morning dawned he caught sight of a little cottage that lay close by. Perhaps it might offer shelter for the poor lost duckling, who felt so helpless in a strange world.

He went up to the door and peeped in. An old woman stood by the hearth, and near by crouched a cat and a hen.

"Perhaps they will not notice how ugly I am, and will let me stay," thought the duckling. And he crept in and waited just inside the doorway.

The cat saw him first, and she began to purr loudly, and the old woman looked round.

The Ugly Duckling held his breath for fear that she should turn him out. But a smile spread over her face.

"How very fortunate I am," she exclaimed, "for now I shall have some duck's eggs!"

But the duckling did not present her with any eggs, and after a time the cat and the hen began to quarrel with him.

"I don't know of what use you are in the world," said the hen disdainfully. "You cannot lay eggs like I can; you cannot even purr like the cat, and nobody could call you handsome."

"I think I had better go, before they turn me away," sighed the poor duckling, "but where to go I cannot think."

And so he left the cottage and returned to the water, feeling even more lonely and helpless than before.

That evening at sunset there came out of the bushes a flock of birds, so beautiful and so white that the Ugly Duckling gazed at them in astonishment. They were swans. It was the first time that he had ever seen a swan, and he thought that he had never seen anything so beautiful. They uttered strange cries as they passed, and for some minutes the duckling watched them, admiring their beauty with sad, half-envious feeling.

"How glorious to be so beautiful!" he thought.

But by and by came the winter, with the cold and the ice, and the poor duckling, cold and often hungry, longed for the home that he had left, for, bad as things had seemed, they were far worse now.

Sometimes the air was so cold that he was obliged to keep swimming about to prevent the water from freezing.

Once he was so tired and stiff with the cold that he could scarcely move, and then the pond froze around him, and he would have died if a farmer, who was passing, had not broken the ice with his stick, and rescued him.

The farmer took him home, and warmed and fed him, and the Ugly

Duckling thought at last he was among friends. But in the afternoon, when the children came home from school, they ran towards him with cries of joy, and the duckling, thinking they meant to do him harm, flew up, and in his terror fluttered into the meal-tub, scattering the meal far and wide. This made the farmer's wife so angry that she picked up a stick to beat him. But luckily he saw her in time to escape.

Once again the duckling was homeless, and all through the winter he suffered from cold and hunger, until at last came the beautiful spring, with soft, gentle breezes and warm sunshine.

"This is good!" said the duckling. "It makes me feel quite strong."

And on he went until he came to a pond. The pond was as smooth and as clear as a mirror, and in passing the Ugly Duckling looked down at his reflection. He was startled. Surely something was wrong! He looked again, and then he gazed all round, but no creature was in sight. What could it mean? Instead of a big, ugly duckling he saw a tall, graceful swan, as beautiful as the birds he had once seen. What had happened? Could it be

that he, the Ugly Duckling, had changed into a beautiful swan?

He looked up, and there he saw, gliding toward him, a number of these beautiful creatures. They greeted him politely, and called him brother. "Come with us," they cried. "You are such a fine fellow, we would have you join us."

And then, lifting up his head, and quivering with excitement, the Ugly Duckling, who no longer deserved his name, proudly followed the rest, with whom he lived happily ever after.



The old woman looked round and a smile spread over her face. "How very fortunate I am!" she exclaimed.

THE COMING OF KING ARTHUR

THREE knights rode along the highway that led to London town one fair, bright morning many years ago. It was tournament day and they were appalled for the jousting, their good arms clanging cheerily now and then against their mail coats.

"By the Rood, father, it is going to be a fine day for the tourney," one of them remarked gaily.

"Aye, son Kaye, so it is — a most propitious day for thy brother Arthur's maiden joust," returned his father, glancing kindly at their younger companion, who of the three alone bore an unblazoned shield — the mark of a maiden knight. The lad flushed to the roots of his fair hair. His hand touched the handle of his sword caressingly.

"You shall not be ashamed of me this day," quoth he, his eyes kindling in anticipation of the fray.

As they were entering the town, suddenly Sir Kaye clapped his hand to his side.

"By St. Dunstan," he exclaimed, "I have left my sword behind me."

For a moment the three surveyed one another in dismayed silence. At last Arthur spoke:

"Ride on to the tourney," he said, concealing his disappointment, "I will go back and get the sword, and return in time for Sir Kaye to enter the lists."

As Arthur was hurrying back through the crowded streets a scrap of talk from some country peasants reached his ears.

"Gramercy! And they say the sword is sticking in a stone in the Cathedral Courtyard!" one was saying.

"Aye, it is a true word," interrupted another, eagerly, "And it but waits for him who is strong enough to draw it from the stone —"

Arthur drew his horse to a standstill. "A sword," — did they say, "a sword in the Cathedral Courtyard?" He turned his horse and in a moment was dismounting before the Cathedral door. It was true! There was the

sword embedded in a huge block of granite before the Cathedral door.

"I must have that sword for Kaye," said Arthur and he grasped its jewelled hilt firmly in his two hands. At first it refused to move. Then slowly as he pulled, it left its stone base. A few minutes later he was presenting the sword to Sir Kaye. Sir Kaye took the sword, examining the mystic words which were graven on the hilt.

"Behold, Sir Hector," he called, spurring his horse to his father's side, "I have procured the Sword of the Stone."

"Tell me how thou camest by it," inquired Sir Hector.

"Arthur brought it to me," he said reluctantly.

"What thou hast done once, thou canst do again," Sir Hector addressed Arthur. "We will return with thee and see if thou canst take the sword out of the stone."

They rode back to the Cathedral and there they drove the sword deep into the stone again. Arthur stepped forward. Sir Hector lifted his hand.

"Wait, thy brother Kaye is the elder. Let him first essay to remove the sword."

Sir Kaye seized it and put forth all his strength in vain. At last he stepped aside, deeply chagrined. Arthur took his place. Winding his fingers strongly about the hilt he drew the sword easily from the stone. He turned about, to find Sir Hector and Sir Kaye kneeling.

"You are no son of mine," said Sir Hector solemnly, "Merlin, that wise old man, gave thee to me to rear when thou wast but a babe. He never disclosed to me thy birth, but now I know. Thou art the son of Uthur, the dead king. Read thou the writing on the sword."

Slowly Arthur read the mystic words:—"He Who Pulleth this Sword from Out the Stone He is the Rightful King of England."

The next day there was a meeting of the knights and Arthur pulled the magic sword from the rock before them all, and was proclaimed king.

THE STORY OF THE SLEEPING BEAUTY

ONCE upon a time all the fairies of the country were invited to the christening of a little baby Princess. Seven fairies came, and they acted as godmothers; and a feast was held in their honour. Just as the feast began an ugly old fairy appeared. Nobody had seen her for fifty years, and, thinking that she had left the country, the King and Queen had not troubled to invite her. This made her very angry, and as she sat down she muttered:

"Before I leave this place I will turn all their joy to sorrow."

Happily, the youngest fairy over-

heard the threat, and slipped away and hid herself behind a curtain.

When the feast was ended the other fairy godmothers came to the little Princess and gave her their christening gifts. The first fairy bestowed on her the gift of angelic beauty; the second, the gift of angelic goodness; the third gave her the gift of genius; the fourth, the gift of exquisite gracefulness; the fifth endowed her with the utmost sweetness of voice, and the last blessed her with every other gift.

"Hold! See, your gifts are useless!" cried the ugly old fairy. "For I give your godchild the gift of being pricked by a spindle, and of dying from the wound."

The King and Queen began to weep. But the youngest fairy sprang from behind the curtains and said:

"Do not weep, my dear King and Queen. The Princess shall not perish. Yet I cannot change entirely the spell which an older fairy has cast upon her. She will be pricked by a spindle. Yes! But instead of dying she will only fall into a sleep lasting a hundred years, and from that sleep she will be awakened by a kiss."

The King at once made a law forbidding everybody to use a spindle, and the Princess never saw one until she was sixteen years of age. Then, in climbing about one of her father's castles in the country, she came to a garret, and found there a simple old serving-woman spinning flax with a spindle and distaff. The Princess took up the spindle to look at it, and the point ran into her hand, and she fell down in a



The Prince strode through the castle gates and found the courtyard covered with bones of horses and soldiers. And over all brooded an awful silence.

deep sleep. The King and Queen summoned all their doctors, but none of them could awaken the Princess. In the meantime the youngest fairy arrived. She bade the King and Queen return to their palace, and leave all their courtiers in the castle. Then she dressed the Princess in a lovely robe and laid her in a golden chamber, and cast a spell upon every living thing in the place. A high, dense thicket of briars, thorns, and brambles at once sprang up around it.

Many persons lost their lives in trying to force a passage through the trees, and at last no one dared to approach it. The King and Queen died without leaving an heir, and a new line of kings began to reign, and in the wars and tumults of a hundred years the story of the Sleeping Princess was forgotten. At the end of that time the son of one of the new kings lost his way while out hunting, and wandered until he came to the Enchanted Castle. He asked who lived in this strange, lonely place. Some replied that it was the haunt of witches; others said it was the dwelling-place of a terrible ogre.

The Prince did not fear danger. He tied his horse to a tree, and, sword in hand, made his way to the castle.

He entered the wood, and the briars and thorns and great trees bent aside and let him pass, and he strode on through the gate of the castle. He found it a place of strange death. The courtyard was covered with the bodies of horses and dogs and soldiers. In the corridors lay waiting-maids and pages, serving-men and messengers, and in the rooms beautiful ladies were stretched beside tall knights and gallant courtiers.

The Prince trembled, but he did not turn back. Still striding on, he opened the door of the Golden Chamber, and there he saw a wonderful sight. In the middle of the chamber stood a great bed hung with rich curtains, and on the bed was a young Princess of angelic loveliness. Surely she lived? He leaned over the Sleeping Beauty to see if she



The Prince opened the door of the Golden Chamber. In the middle stood a great bed, and on it lay a young Princess.

breathed, and touched her lips with his. The Princess opened her eyes.

"Is that you, my Prince?" she said. "I have been waiting a long, long time."

They began to tell each other the story of their adventures, but they were soon interrupted. For every living thing in the castle had awakened with the Princess. The dogs barked, the cocks crew, and the soldiers took up their arms. The messengers ran along the corridors with messages given to them a hundred years ago, and upset the trays of the waiting-maids. The courtiers made love to the beautiful ladies, and the maid of honour entered the Golden Chamber and said the dinner cooked a hundred years ago was ready.

Soon after they went to a little chapel in the Enchanted Castle, where they were married, and then set out for the palace of the King, where they were welcomed with wonder and joy.

THE STORY OF THE GOLDEN APPLE

ONE of the goddesses was so mischievous and caused so much trouble that she was named Discord, and Jupiter, king of the gods, drove her from his kingdom. This made her so angry that she determined to be revenged.

At a grand wedding that took place on the earth, when all the goddesses except Discord were present, Discord threw in a golden apple, on which was written, "To the Fairest." Discord knew that this would cause great jealousy; and so it did, for each of the goddesses claimed that she was the most beautiful, and ought, therefore, to have the prize.

At last Juno, Minerva, and Venus were chosen as the most beautiful. There was only one prize, however, and everyone was so afraid of offending these three powerful goddesses that they dared not decide which of the three should have the apple.

It was arranged that a young shepherd named Paris should make the choice, and each of the three goddesses offered Paris a precious gift if he would award her the prize. Juno offered him a kingdom; Minerva offered him great

success in battle; Venus said she would give him the most beautiful woman in the world for his wife.

Paris chose Venus as the fairest. Some say that Venus was chosen because of her famous girdle, which gave to anybody who wore it great beauty and grace. Others say that Paris chose Venus because she promised him the most beautiful wife.

Paris was the son of the King and Queen of Troy, who had cast him off when a baby, but had now called him back to his home. He never forgot Venus's promise, and when he was a brave warrior he heard of the great beauty of Helen, and said to himself, "This is the woman Venus promised me."

So Paris assembled his ships and men, and sailed to the land where Helen lived. There he found Helen, and stole her from her husband and took her back to Troy. Helen's husband, Menelaus, came to Troy with all his princes to fetch Helen away, and for years a terrible war was fought between them. In the end Paris was killed, and Menelaus carried Helen back to her own home in Sparta.

THE STORY OF THE MAGIC CARPET

A SULTAN of India had three handsome sons, and they all fell in love with their pretty cousin, Princess Nourounnihar. One day their father called them together and said:

"You know how fond I am of curious objects? Well, I will grant the hand of the Princess to him who brings me the most wonderful thing."

After arranging to meet at an inn at the end of the year, the three brothers set out on their travels.

Prince Houssain, the eldest, went to Bisanagar, where he saw a Crier offering a carpet for forty purses of gold.

"That's a lot of money for a carpet," he said.

"No, it isn't," said the Crier. "Just sit on it, and wish yourself in some other place."

Prince Houssain sat on the carpet, and wished himself in his house, and, lo! he found himself in his bedroom. So he returned to the Crier, and gave him forty purses of gold for the carpet.

"I'm sure I shall win Nourounnihar with the carpet," he said.

He then wished himself in the inn where he had arranged to meet his brothers, and there waited for them.

Prince Ali, the second brother, went to Shiraz, where he saw a Crier offering a plain ivory tube for forty purses of gold.

"That's a lot of money for a tube," he said.

"No, it isn't," said the Crier. "Just look through it, and wish to see somebody."

Prince Ali looked through it, and wished to see the Princess, and, lo! he saw her sitting with her maids-of-honour in his father's palace. So he gave the Crier forty purses of gold, saying:

"I'm sure I shall win Nourounnihar with this tube."

He hastened to the inn, and there he and Houssain waited for Ahmed.

Prince Ahmed had gone to Samarcand. There he met a Crier who offered him an apple for forty purses of gold.

"That's a lot of money for an apple," he said.

"No, it isn't," said the Crier. Just let the man who is dying in the next street smell the apple."

The Prince did so, and the dying man at once recovered his health. After paying the forty purses of gold, Prince Ahmed hastened to the inn and showed his brothers his apple, and they showed him their carpet and tube.

"It's hard to say which is the most wonderful," said Prince Houssain. "Lend me your tube, Ali."

Houssain looked through it, and wished to see Princess Nourounnihar.

tell you how to settle the matter. Take a bow and arrow each, and go into the great plain outside the city. He who shoots his arrow farthest shall marry the Princess."

Crowds came to watch the contest. Houssain sent his arrow a good way; Ali sent his still farther; Prince Ahmed shot so well that his arrow went out of sight! Nobody, however, could find it, so the Sultan decided that Ali had won Nourounnihar.

Prince Ahmed did not grieve long for his pretty cousin. What troubled



Houssain, looking through the magic tube, saw the Princess. She lay pale on her bed, dying. The brothers jumped on the magic carpet, which carried them to the castle, and Prince Ahmed's magic apple saved her life.

"Heavens!" he cried. "What do I see? She is lying pale and motionless on a bed, and her maids are weeping. Oh, she's dying!"

"Quick, jump on the carpet!" said Prince Ahmed. They all jumped on it, and wished themselves in the Princess's bed-room. When they got there Prince Ahmed let her smell his apple, and she regained perfect health.

"Now, which of us has won Nourounnihar?" said the brothers.

"You all had an equal share in curing her," said the Sultan. "I'll

him was the way in which his arrow had disappeared. He wandered for weeks about the plain seeking it, and at last found the palace of fairy Pari-Banou.

It was Pari-Banou who had sent the Criers with the magic carpet and the enchanted tube and the fairy apple. But she did not want Prince Ahmed to marry Nourounnihar, so she had caught up his arrow and carried it away. She wanted to marry him herself. Ahmed fell deeply in love with her, and married her, and with her help he became the Sultan of India.

The next Stories begin on page 1791.

The Child's Book of SCHOOL LESSONS

WHAT THESE LESSONS TEACH US

THE Reading lesson in these pages teaches us what we mean when we speak of singular and plural numbers. Our Writing lesson shows us how to write more letters that come above and below the line, and in our Arithmetic lesson we learn how to add little numbers together. There are still more surprises for us in the Music lesson, and our Drawing lesson shows us how to draw a box and a table. The Picture-Story in French describes how the party, which has now reached Paris, spend their first evening at the hotel.

CONTINUED FROM PAGE 1456

READING LESSON

THE DIFFERENCE BETWEEN ONE AND TWO

WHEN you see a dog come running round the street corner, you call out, "Look at that **DOG!**" but if another dog came with the first one you would say, "Look at those **DOGS!**"

And if I gave you a penny you would tell mother, "I have a **PEN-NY**," but if I gave you two you would say, "I have two **PEN-NIES**."



PENNY



PENNIES

Then the Queen of Hearts did not make only one **TART**; she made many **TARTS**, and the naughty knave came and stole them away.



TART



TARTS

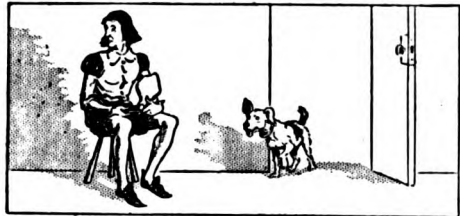
So, you see, there is a difference between **DOG** and **DOGS**, and between **PENNY** and **PENNIES**, and between **TART** and **TARTS**. **DOG** means only one dog, but **DOGS** means any number of them—two, or three, or a hundred, or a million. We say that **DOG** is in the *singular* number and **DOGS** in the *plural* number. When there is only one thing it is singular; when there are more than one it is plural.

If you look in the looking-glass you will see that you have two hands; but put one in your pocket and you will only see one hand in the looking-glass. So, you see, we talk about one **HAND**, but two **HANDS**.

Go on looking in the glass, and you will see many more things that you can make either singular or plural. Here are some of them:

EYE	EYES
LIP	LIPS
ARM	ARMS
THUMB	THUMBS
FIN-GER	FIN-TERS
NAIL	NAILS
LEG	LEGS
FOOT	FEET

Now you will be able to read this riddle, and to answer it as well:



Two **LEGS** sat upon three **LEGS** with one **LEG** in his **ARMS**;
In came four **LEGS** and ran away with one **LEG**;



Up jumped two **LEGS**, picked up three **LEGS**, and threw them at four **LEGS**.

By this time we are ready for some rhymes, so here they are. They are not the rhymes that we know, are they? But perhaps we shall like them as well.

When
PUSS
IN
BOOTS



wears
STOCK-
INGS
too,



And Mary is not so contrary,

When
RED
RIDING
HOOD



is
dressed
in
blue,

And
every
CHILD



becomes
a
FAIRY,



We'll fly away,
I think—don't you?

When
the
little
BOY



who
plays
the
HORN



Is dressed in green instead of blue,

When
MILK-
MAIDS



are not
all
forlorn,

And every fairy tale comes true,
We'll fly away,
I think—don't you?

When
SPIDERS



all stop
catch-
ing
FLIES,



And tell Miss Muffet what to do,

There'll
be no
COB-
WEBS



on the
skies,



OLD
WOMAN
with the

BROOM,
for
you;



So fly away
And find your shoe.

When
KINGS



no
longer
count
their
MONEY,



And
BLACK-
BIRD
PIES



hold twenty-
two,

When
QUEENS



like
jam
much
more
than



HONEY

And maids have noses fixed with glue,
I think it will
Seem queer—don't you?

PRIMARY READING LESSON

<p>There was an old woman, Tossed up in a basket, Seventeen times as high as the moon, Where she was going, I could not but ask it, For in her hand she carried a broom.</p>	<p>Old woman, old woman, old woman, quoth I, Where are you going up so high? To sweep the cobwebs off the sky. May I go with you? Aye, bye and bye.</p>
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<p>Old woman, old woman, old woman! Where are you going? Where are you going in a basket? Where are you going with a broom?</p>	<p>May I go with you? Aye, bye and bye. May I go up so high? Aye, bye and bye. Will you come back? Aye, bye and bye.</p>
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<p>I go up, up, up! I go so high, so high, so high! Up over the tree-tops, Up over the moon, To the sky, to the sky, to the sky!</p>	<p>I am in a basket, I go up to the sky, I go up to brush the cobwebs off. Here I go up, up, up! Good-bye! good-bye! good-bye!</p>
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ACTION SENTENCES

<p>Play you are the old woman, Jump into the basket,</p>	<p>Take the broom, Sail away. Come back again.</p>
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LITTLE VERSES FOR VERY LITTLE PEOPLE

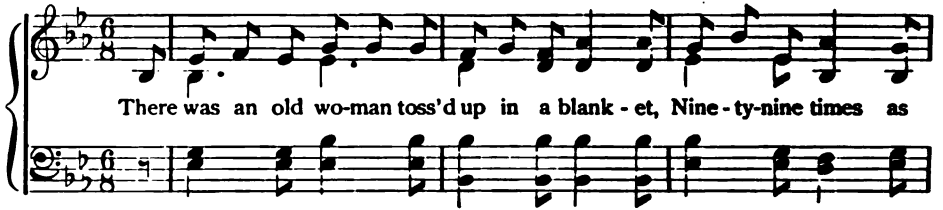
GOOD little boys should never say
 "I will," and "Give me these";
 Oh, no! that never is the way,
 But "Mother, if you please."

And "If you please," to Sister Ann
 Good boys to say are ready;
 And "Yes, sir," to a gentleman,
 And "Yes, ma'am," to a lady.

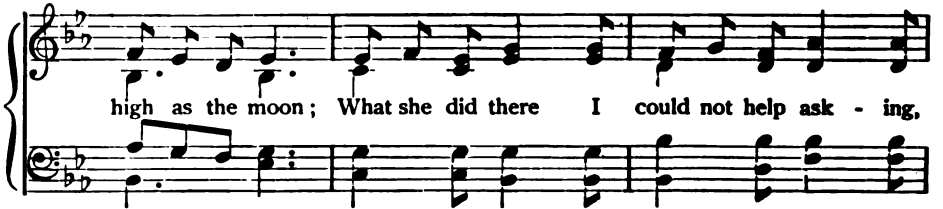
ST. SWITHIN'S DAY, if thou dost rain,
 For forty days it will remain;
 St. Swithin's Day, if thou be fair,
 For forty days 'twill rain nae mair.

IF Candlemas Day be bright and fair,
 Winter will have another flight;
 If on Candlemas Day it beshower and rain,
 Winter is gone and will not come again.

THE OLD WOMAN TOSSED UP IN A BLANKET



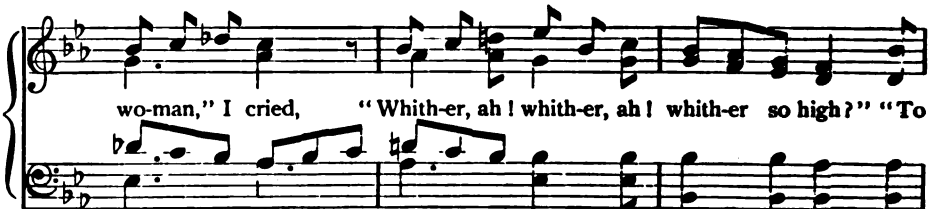
There was an old wo-man toss'd up in a blank-et, Nine-ty-nine times as



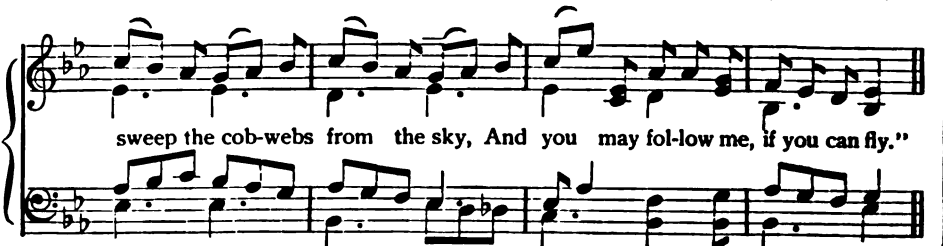
high as the moon; What she did there I could not help ask-ing,



For in each hand she car-ried a broom. "Old wo-man, old wo-man, old



wo-man," I cried, "Whith-er, ah! whith-er, ah! whith-er so high?" "To

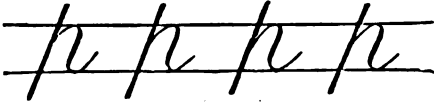


sweep the cob-webs from the sky, And you may fol-low me, if you can fly."

MORE LETTERS BELOW THE LINE

"**A**RE there more letters with loops below the line, mother?" asked Nora, when she and Tom next came to their mother for the writing lesson.

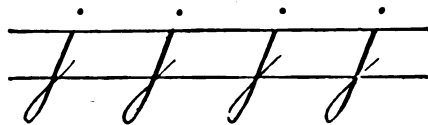
"Four of them," her mother said, "and I hope we shall write all of them to-day. But first we are going to write one other letter with a stroke below the line, but without any loop. It is p. What do you think of it?" she asked, as she wrote some like this:



Nora thought it reminded her of h—at least, the last part of it was just like h; and Tom said the first part was a long stroke.

"You are both right," said their mother; "p does begin with a long stroke, and ends like h, but we must be careful to make the stroke the proper length. It goes above the upper line just as far as t does, and below the lower one not quite so far as any other letter with a tail. We must remember that it does not go very far above or below the line.

"This is the next letter, j," continued the children's mother, as she wrote it:

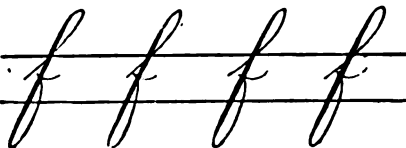


"J has a loop," said Nora, "and—Why, it has a dot! Look, Tom!"

"Each letter i has its own little eye," said Tom, who remembered all about i.

"J," said his mother, "really did grow from i, just as a plant grows from a seedling. Once there was no j; but it was useful to have one, and so someone made i grow a looped tail. We must take care to make the loop just like that of g. Let it cross over just below the line, Tom.

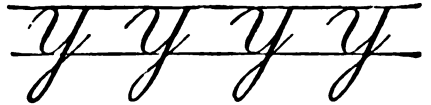
"The next letter, f, has two loops, and this is how we write it:



"There is this to notice about f: the upper loop is not quite so tall as that of other looped letters, and what do you see strange about the lower loop, Nora?"

Nora watched while her mother wrote an f, and then said the lower loop was on the other side. Tom said she meant the right side, and their mother showed how it ended half-way between the lines near the middle of the letter on the right side of it, as Tom had said. Nora thought f was a pretty letter, because she liked making the loops, but neither she nor Tom found it very easy to write at first, for they wanted to make the lower loop on the left side, like that of g and j, and the loops looked uneven; but they tried again and again till they made nice ones.

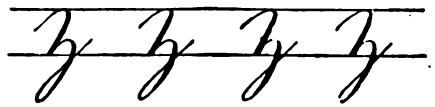
"There are only two more small letters to write—y and z, and then you will know all the small letters," their mother told them, as she wrote y like this:



Tom noticed that y began like the last part of h, and, Nora added, like the last part of m and n also; and both of them found its tail had just the same loop as that of g.

"Now the last letter of the alphabet, Tom," said his mother.

"Z," he promptly replied, as he watched her writing it like this:



She pointed out how z starts with a hook, as y does, but leans more to the right, and then makes a much smaller curve just above the lower line, ending in a loop like that of g. Only the middle curve was new to Tom and Nora, and they soon succeeded in making it nicely, and then their mother told them that before very long they should learn to do something quite new.

two numbers just as we did before, with the "ones" under the "ones," and the "tens" under the "tens," like this :

47
23
—

Then we say, "3 'ones' and 7 'ones' make a 'ten.'" Write down a 0 under the "ones," because there are no "ones" left, and add the "ten" to the other "tens," saying, "1 'ten' and 2 'tens' make 3 'tens' ; 3 'tens' and 4 'tens' make 7 'tens.'" Write a 7 under the "tens." After we have done a few sums of this sort we can do without saying even as much as that ;

we can leave out the words "ones" and "tens." 47
23
—

make 70

Say, 3 and 7, 10 ; put down 0, carry 1.

1 and 2 make 3, and 4 make 7 ; put down 7.

Try to find the sums in the same way.

1. There are 34 houses on one side of the street, and 36 on the other side. How many houses are there on the two sides together ?

2. On: boy sold 22 oranges, and another sold 18. How many oranges is that altogether ?

MUSIC

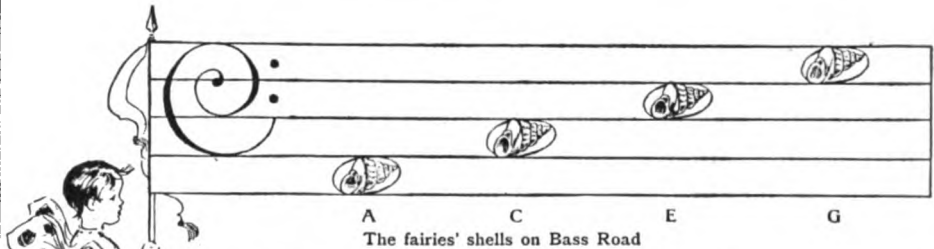
THE FAIRIES INSIDE THE SHELLS

LITTLE Bass Clef is very anxious to attract our attention. He has waited long and patiently to see what secret the flowers had to tell, and now he knows what a pretty surprise the fairies had prepared, he is very eager to see if the story whispered in his ears by the wind is true.

Once again we look at the motor-cars

that are lying in the spaces between the motor-lines where the cocoa-nuts are found.

The kind little fairies have given Treble Clef a treat, and they feel that Bass Clef must have his share in the happiness that comes to all good, industrious workers ; so four of the wee people say they will make these



waiting in the Treble Road, and we know that they belong to the Fairies E, G, B, D, and F.

The pretty flowers are still in the spaces between those same motor-lines, and are proud because the

Fairies F, A, C, and E dwell within their tiny petals.

The cocoa-nuts remain in their places on the five motor-lines in the Bass Road, very happy to be the homes of Fairies G, B, D, F, and A.

And now we have something else to find out. Look at the pretty shells

four pretty shells homes of beautiful sound. In other words, they will come and sit inside the shells, and sing their pretty song when the right note on the piano is pressed.

Do you remember that little Bass Clef made us pass by the nine little white doors, which we now call notes, lying to the left of Fairy C's middle house (see the picture on page 650), and when we came to the tenth note we pressed it very firmly, and immediately we heard the deep voice of Fairy G ? Well, Bass Clef now says, "If you go to the little white note on the right side of Fairy G you will find out the song of the shell in this first space between Fairy G's cocoa-nut on

THE ADDRESSES OF THE LITTLE FAIRIES



Fairy C.
Line 1.
Treble Staff



Fairy G.
Line 2.
Treble Staff



Fairy B.
Line 3.
Treble Staff



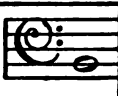
Fairy D.
Line 4.
Treble Staff



Fairy F.
Line 5.
Treble Staff



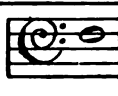
Fairy G.
Line 1.
Bass Staff



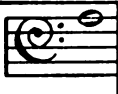
Fairy B.
Line 2.
Bass Staff



Fairy D.
Line 3.
Bass Staff



Fairy F.
Line 4.
Bass Staff




Fairy A.
Line 5.
Bass Staff



Fairy F.
Space 1.
Treble Staff



Fairy A.
Space 2.
Treble Staff



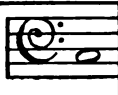
Fairy C.
Space 3.
Treble Staff



Fairy E.
Space 4.
Treble Staff



Fairy A.
Space 1.
Bass Staff



Fairy C.
Space 2.
Bass Staff



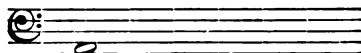
Fairy E.
Space 3.
Bass Staff



Fairy G.
Space 4.
Bass Staff

line number one, and Fairy B's cocoa-nut on line number two. Press the little white note and listen :

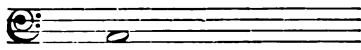
Indigo shell, the song of the spray,
And space number one for Fairy A



Fairy A's shell

"What about the second shell?" we ask Bass Clef. He shakes his wise little head, and tells us to go to the piano, saying, "You remember on which line Fairy B's cocoa-nut is to be found? Well, the very next white note on the right of Fairy B is the one to press, if you want to find out about the shell in the second space." Directly we press the note we hear this :

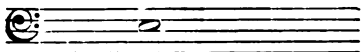
A tiny red shell, space number two,
Fairy C sings, "How do you do?"



Fairy C's shell

The third shell is now arousing our curiosity, and the only thing to do is to press the little white note between Fairy D's cocoa-nut on the third line and Fairy F's cocoa-nut on line number four. Press it and listen :

A yellow shell for Fairy E,
We both quite like space number three.

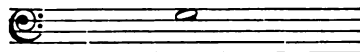


Fairy E's shell

One more shell, so one more fairy to find. To discover what we want we will again visit our piano, and choose the white note in the fourth space, lying

between Fairy F's cocoa-nut and the cocoa-nut which has been claimed by Fairy A. Press the note and we shall hear :

Space number four, little blue shell,
Fairy G's voice all news will tell.



Fairy G's shell

Do you not think that this magic kingdom of the piano is a very happy one? In the Treble Road we find fairies in their motor-cars, E, G, B, D, F. In the Bass Road fairies are laughing in their cocoa-nuts. Their names, as you know, are, G, B, D, F, A. Treble Clef again shows us fairies kissing the petals of the delicate flowers in which they have found so pretty a home—the Fairies F, A, C, E.

Bass Clef comes forward once more to introduce the fairies, who are seated inside the pretty shells, listening to the song of the waves. You know them by their names, A, C, E, G. All this, and much more, can be heard and seen by you and me, as day by day we find ourselves more at home in our magic kingdom. We must be quite sure we know how to address the fairies' letters when we write to them. So we will direct some envelopes, like those on the opposite page, ready for the little notes, when we want to write to them.

Staff, you know, is the fairies' word for road.

Now that we have seen how to direct the envelopes, shall we have a game of play, and see who can address the greatest number?

DRAWING

THE RIGHT WAY TO DRAW A BOX

TO-DAY we are going to learn how to draw a box. It seems quite an easy thing to do, but it really is not easy at all. In drawing boxes, just like everything else, there is a right and wrong way of doing it. On the next page we can see some of the wrong ones, and some of the right ones. Can you tell which is which without being told? Suppose we try to draw some ourselves, without looking at a real box, or any of the pictures.

I hope the one you have chosen is the right one. How many sides has it? An ordinary box has six sides—four standing up, and two—the top and the bottom—flat; but you can never see more than three at one time. Sometimes we can see only two, and sometimes only one; but we don't draw it often to show only one side, as it doesn't look like a box at all then.

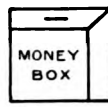
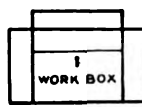
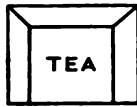
Choose a box with straight sides and a flat top, and put it exactly in front

of you a little way off on the table. If it is exactly opposite to you and your eye above it, you can only see two sides—the front and the top. Now move it to the right, and you will see three sides—the front, the top, and one other. Move it to the left, and you see three again, but they will not be the same that you saw before.

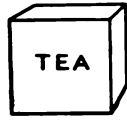
Get some brown paper, and pin it to your board, and get your white and black chalk. It is better to choose a square box to copy, although an oblong one will do. Put the box exactly opposite to you, and when you are drawing things like boxes, always begin with the part that is nearest to you. It is the front side this time, and that is easy, as it is only a square or an oblong. Take your black chalk, and make the best square or oblong that you can, and fill it in with chalk.

How can you make the top look flat? It will not look right if you make it the same size and shape as the front, because things look smaller when they get a little further away from us.

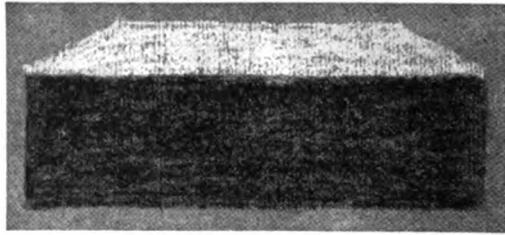
When you are in the street, the lamp-posts that are far away look quite tiny, yet they are the same size as those quite near; and when you are at the seaside, big ships look smaller



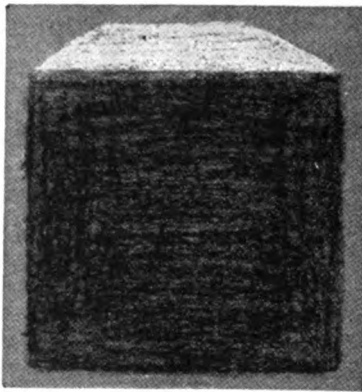
The wrong way to draw boxes



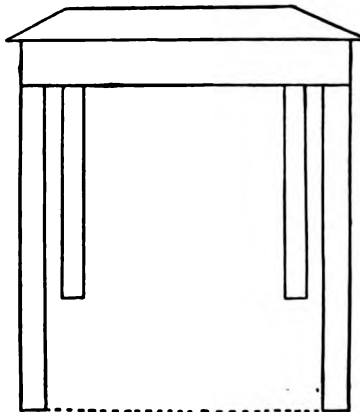
The right way to draw boxes



An oblong box drawn in black and white chalk on brown paper



This is a square box drawn in black and white chalk on brown paper



This picture shows how we may turn a drawing of a square box into a table

and smaller as they sail away from the shore.

So the part of the box that is furthest away from us must be smaller than the one nearest to us. The top of the box must slant, and look narrower than the front. You must look at the picture to see the way to do it.

Make the top with white chalk, because it will look the lightest part. If you were drawing to the window, the front side might look the lightest, but you must never draw with your back to the light, because it is very bad for the eyes.

We shall not learn this time how to draw the box when it shows three sides, as it is difficult to do; but if you like to get your pencil now, and some white paper, you can copy the last picture on this page, which shows how to turn a box into a table.

Draw the box first, then put some more lines to make the legs and the thickness of the wood. Rub away the line that is dotted, and there is the table.

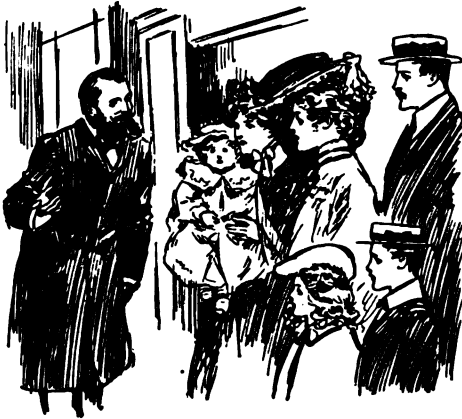
Square legs would show the sides as well as the front, but we must not attempt to draw the side view just yet.

Why are the back legs shorter than the front? They are not really shorter in a real table, but those that are furthest away from us always look shorter.

LITTLE PICTURE-STORIES IN FRENCH

IN our story this time, which is continued from page 655, we read how the party spend their first evening in Paris. The first line under each picture is the French, the second gives the English word for the French word above it, and the third line shows how we make up the words into our own language.

Nous sommes à l'hôtel.
We are at the hotel.
We get to the hotel.



Le maître d'hôtel nous salue.
The manager us salutes.
The manager greets us.



La bonne nous montre nos chambres.
The maid us shows our rooms.
The maid shows us our rooms.

Nous lui demandons son nom.
We of her demand her name.
We ask her her name.

Elle répond : "Annette."
She replies : "Annette."
She answers : "Annette."

Bébé a bien sommeil
Baby has much sleep.
Baby is very sleepy.



Maman dit : "Embrassez-moi, bébé."
Mamma says : "Embrace me, baby."
Mamma says : "Kiss me, baby."

Tantôt nous entendons un petit cri.
Presently we hear a little cry.
Presently we hear a little cry.

Jeannette court à la porte.
Jenny runs to the door.
Jenny runs to the door.



Une petite fille est là.
A little girl is there.
A little girl is standing there.

Jeannette la conduit à maman.
Jenny her conducts to mamma.
 Jenny leads her to mamma.

Elle pleure.
She is crying.
 She is crying.



Maman la console.
Mamma her comforts.
 Mamma comforts her.

Elle a perdu sa bonne.
She has lost her nurse.
 She has lost her nurse.



Nous lui montrons de drôles d'images.
We to her show of droll of pictures.
 We show her some funny pictures.

Elle éclate de rire.
She bursts of to laugh.
 She bursts out laughing.

Quelqu'un frappe à la porte.
Someone knocks at the door.
 Someone knocks at the door.

Maman crie : "Entrez !"
Mamma cries : "Enter !"
 Mamma calls out : "Come in !"

La porte s'ouvre.
The door itself opens.
 The door opens.

Une jeune femme entre
A young woman enters.
 A young woman comes in.



C'est la bonne de la petite fille.
It is the nurse of the little girl.
 It is the little girl's nurse.

La bonne tend les bras.
The nurse tenders the arms.
 The nurse holds out her arms.



La petite fille court à elle.
The little girl runs to her.
 The little girl runs to her.

Nous crions tous : "Bonsoir !"
We cry all : "Good-evening !"
 We all call out : "Good night !"

The next School Lessons begin on page 1929

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